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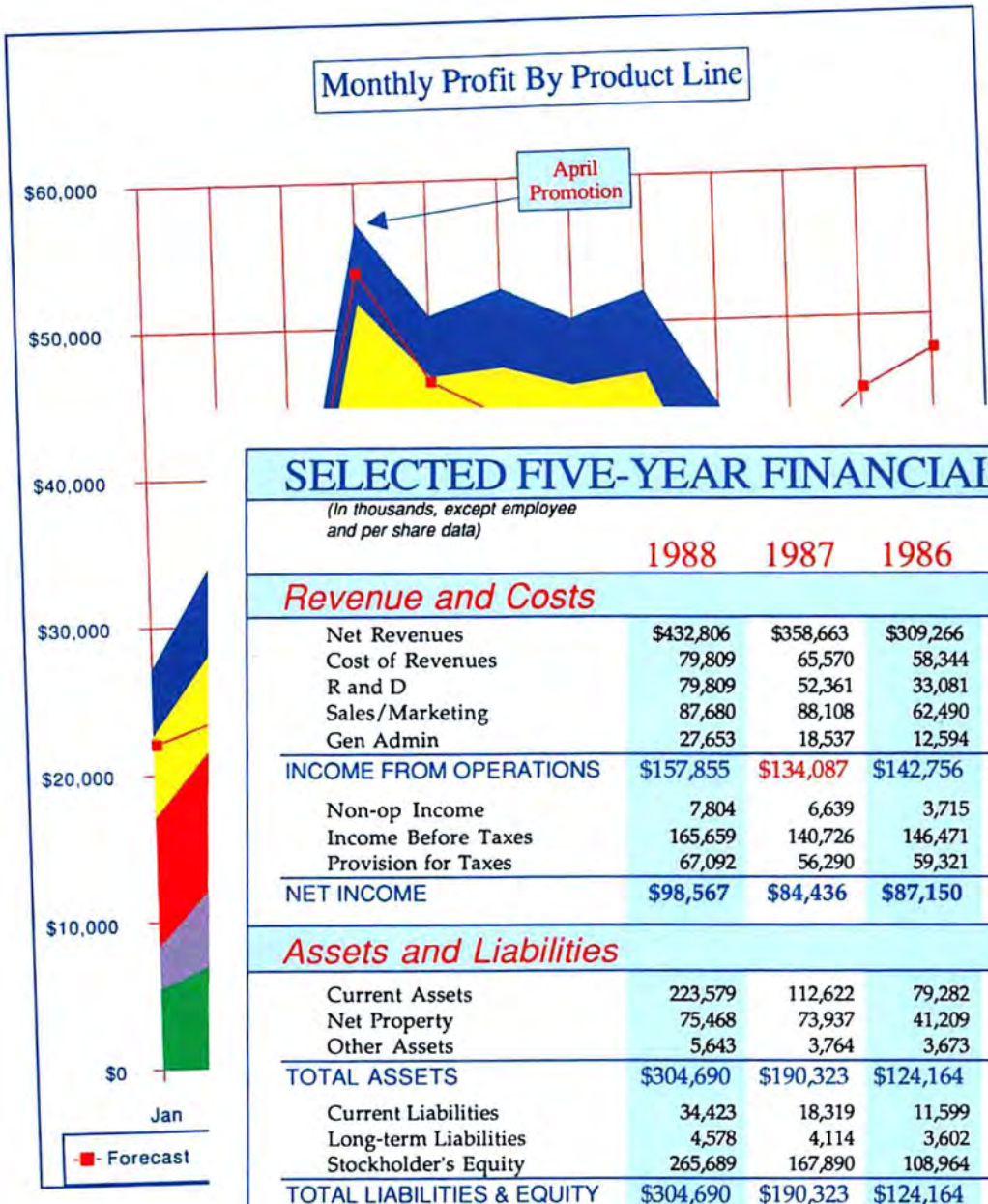
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SELECTED FIVE-YEAR FINANCIAL DATA

(In thousands, except employee and per share data)

	1988	1987	1986	1985	1984
Revenue and Costs					
Net Revenues	$432,806	$358,663	$309,266	$239,656	$207,907
Cost of Revenues	79,809	65,570	58,344	40,710	40,215
R and D	79,809	52,361	33,081	21,420	20,676
Sales/Marketing	87,680	88,108	62,490	48,999	26,409
Gen Admin	27,653	18,537	12,594	7,306	4,520
INCOME FROM OPERATIONS	$157,855	$134,087	$142,756	$121,221	$116,088
Non-op Income	7,804	6,639	3,715	2,008	1,387
Income Before Taxes	165,659	140,726	146,471	123,229	117,475
Provision for Taxes	67,092	56,290	59,321	49,908	47,577
NET INCOME	$98,567	$84,436	$87,150	$73,321	$69,898
Assets and Liabilities					
Current Assets	223,579	112,622	79,282	44,256	44,055
Net Property	75,468	73,937	41,209	24,957	19,374
Other Assets	5,643	3,764	3,673	2,402	1,899
TOTAL ASSETS	$304,690	$190,323	$124,164	$71,615	$65,327
Current Liabilities	34,423	18,319	11,599	5,077	9,940
Long-term Liabilities	4,578	4,114	3,602	3,293	3,146
Stockholder's Equity	265,689	167,890	108,964	63,245	52,242
TOTAL LIABILITIES & EQUITY	$304,690	$190,323	$124,164	$71,615	$65,327
Working Capital	189,642	173,468	127,766	119,489	77,041
Number of Employees	3,456	2,727	1,681	1,390	1,086
Common Stock Data					
Net Income per Share	$1.13	$1.64	$1.94	$1.90	$2.59
Book Value per Share	$4.56	$3.56	$2.29	$1.46	$0.78
Cash and Investments	$2.65	$1.60	$0.83	$0.64	$0.48
Average Shares Out	87,535	83,258	44,956	38,634	26,984
Shares Out/Year-end	86,790	51,305	26,589	15,905	9,082
Key Ratios					
Return on Net Revenues	23%	23%	28%	31%	34%
Return on Total Assets	32%	44%	70%	102%	107%
Return on Stock Equity	37%	50%	80%	116%	134%



As you can see, there's more than one way to highlight: Now pick from 256 fonts. Change row height. Shade. And get used to the sound of applause.

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So have we. Introducing Microsoft Excel 2.2.

Back in 1985, not long after the Macintosh® was unveiled, Microsoft® Excel became the most compelling reason to buy one.

Within minutes, it was the spreadsheet standard on the Macintosh. And before we knew it, a full 9 out of 10 Macintosh spreadsheet users were swearing by it.

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Used to be, 1MB was enough. Now with Microsoft Excel 2.2, you can take full advantage of the 8 megs in today's most powerful Macintoshes.

But while many consider Microsoft Excel to be one incredible spreadsheet, we've been working on a way to change all that. The result: Microsoft Excel version 2.2 has just come to the small screen.

In simple mathematical terms, let's just say that 2.2 is greater than 1.5. In more technical terms, let's just say that now your spreadsheets aren't limited to 1MB of memory—version 2.2 taps every ounce of power from even the 8 meg machines. Which means very soon you'll be creating spreadsheets of outrageous proportions.

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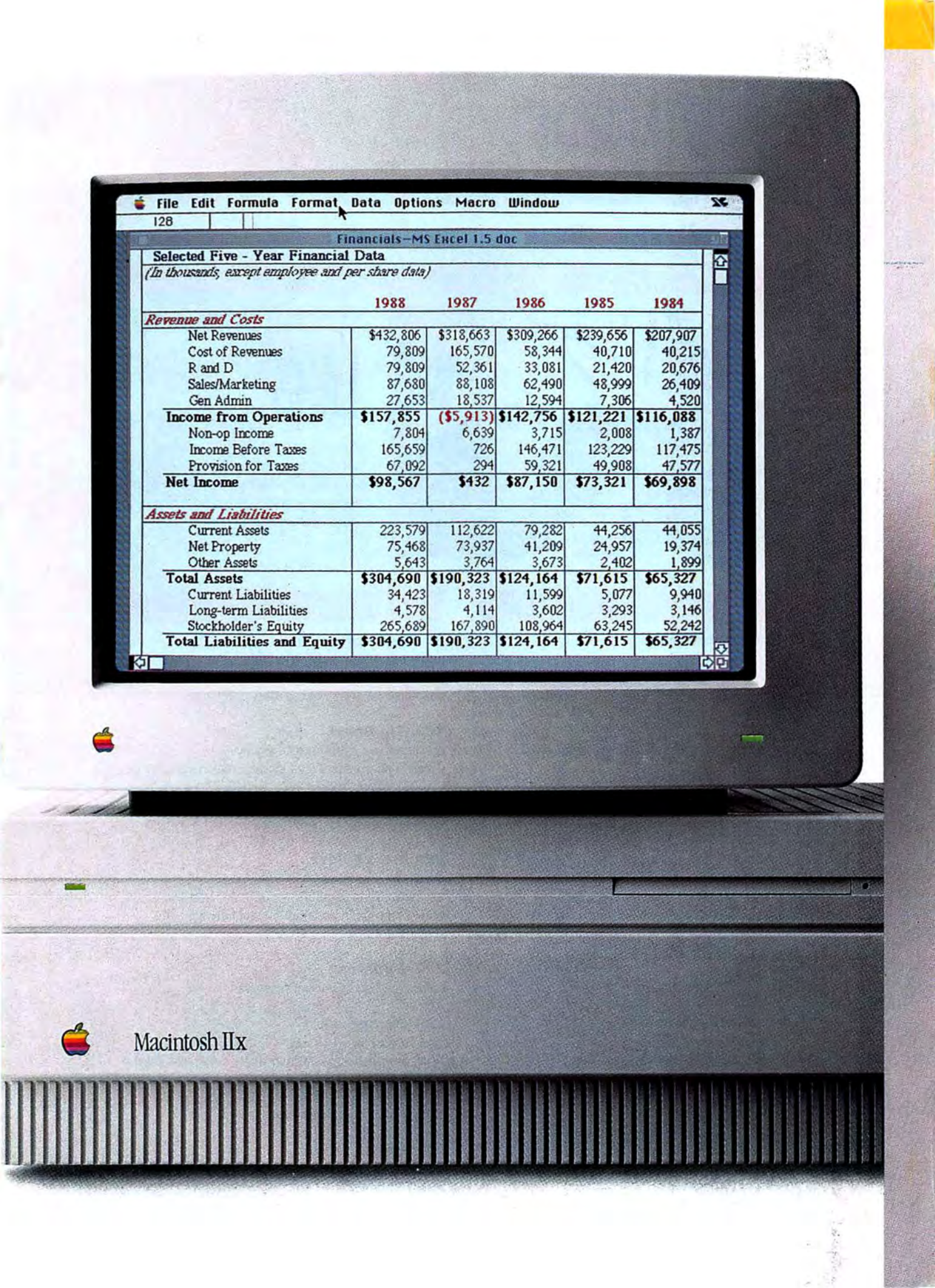
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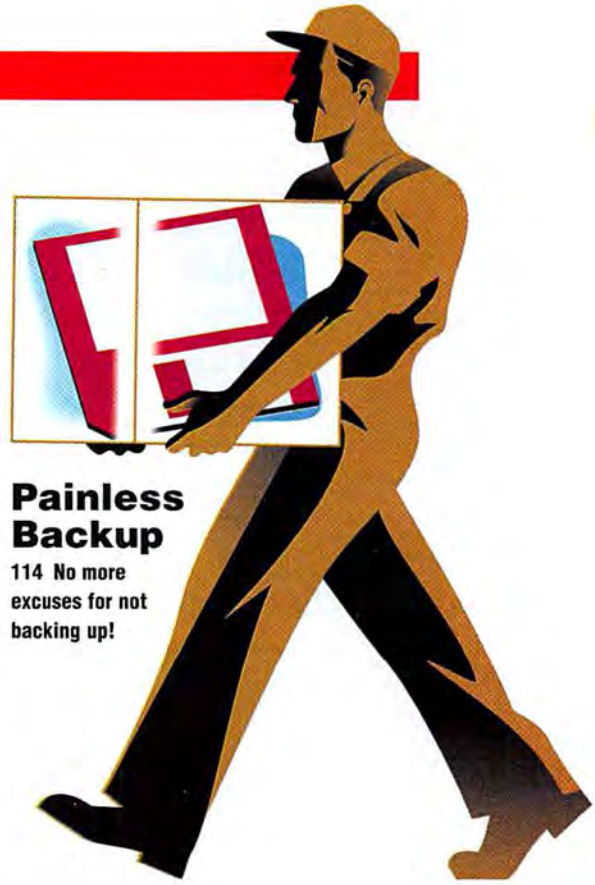
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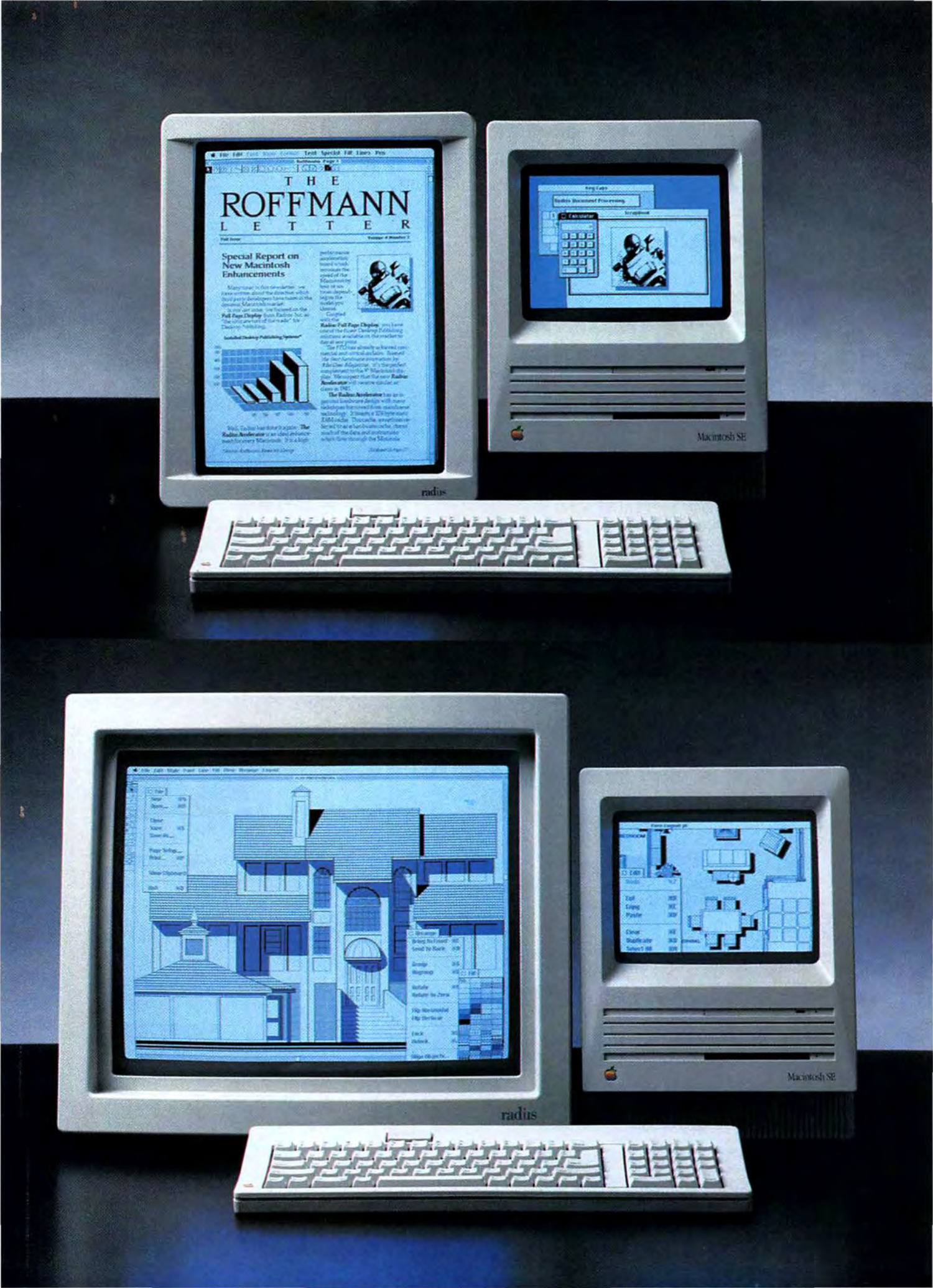
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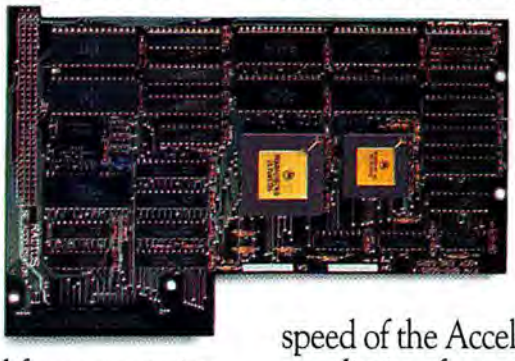

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Software to Watch Over Me



BY PAUL SOMERSON

To paraphrase Freud: What do Mac users really want?

Jeff Miller, this magazine's associate publisher, can rattle off some pretty convincing answers. Pure and simple, according to Jeff, they want *superior solutions* for their business and creative needs. To achieve this they want to be at the *cutting edge* of technology. And they're clearly willing to take the risks that such a pioneering, leadership role implies.

Enough of you feel this way that the Mac has become a thriving second standard in the desktop-PC market. But the real puzzler quickly becomes: What will tomorrow's Mac users want? And will Apple be the company to deliver it?

A group of concerned Mac experts recently chewed over this question on Neil Shapiro's electronic MAUG forum on CompuServe. And most of the responses were predictable: Make future Macs cheaper, faster, and bigger.

Well, it's hard to argue against cheaper. Prospective buyers have to plunk down several thousand dollars more for a beefy Mac CPU and printer than for a roughly equivalent DOS system. While it's true that, for millions of enlightened users, the Mac I/O advantage is worth the price difference and that DOS machines carry a hidden penalty in user frustration and training woes, try explaining that to a hard-nosed corporate bean counter who's authorizing the purchase of a hundred systems. All he can see is six-figure savings and a fat year-end bonus that will pay for his kid's primal therapy and his wife's liposuction.

It's also tough to argue against faster. Countless human-factors studies have proved the perceived superiority of millisecond reaction times. Sit two users down at otherwise identical hardware, where one system launches programs and pops screens instantaneously and the other is saddled by normal Mac disk-access, screen-drawing, and CPU-bottleneck delays. Even though the user at the speedier system doesn't actually get much more work done than his slightly slower counterpart, the differences in feel are significant. Nobody likes to wait, and when you're tooling along, even half-second lag times become intolerable. QuickDraw is anything but quick, and the Mac cries out for a graphics coprocessor, better I/O handling, and a foolproof memory-caching system. DTP is the number 1 Mac application, but anyone who has had to crank out complex PostScript images quickly learns the true, deep meaning of patience.

And, of course, bigger is not only better these days; it's necessary. TIFF files can certainly pack a graphical wallop, and MultiFinder can sure give you added system muscle — until you start getting messages that your new 40-meg hard disk has filled up in the first week and that your 5 megs of pricey RAM just aren't enough to juggle all the programs you normally run.

Apart from issuing a steady stream of comments that all prices ought to be lower, forum participants asked for improvements like speedy, terabyte optical drives, 300-dpi screens, RISC architecture that would let the hardware "hum along at 20 mips," a speech-recognition-driven OS with appropriate Toolbox support, even "body-language gesture input."

Amid all the drooling, one or two lonely voices did manage to answer the question dead-center perfect. The real answer isn't a cheap Cray with an Apple logo. It's a brand-new generation of smart software.

For starters, one bold soul suggested some easy system-software fixes, the kind that would back up his data effortlessly, or use a mass-storage device as virtual memory when needed, without user intervention, or warn him when things were "looking bad." He's close.

Another user, Jack Howarth, edged closer to the real solution: "The general movement I want to see . . . is away from traditional software as tools in the Toolbox (which are only as productive as the skill the user has in wielding them) to software that acts as a servant/aide/advisor to the user in a much more sophisticated manner If the user has to open a manual to use it, the software has a bug somewhere."

Doug Jacobson carried this argument even further: "The key to the future must be the software. Seamless integration of multiple applications running concurrently, an operating system that will be able to 'think' a few steps ahead of you, learning as you use it."

Exactly. It's the difference, as CompuServe sysop Lofty Becker puts it, between telling an application's macro recorder to "watch me" and giving the same message to a real assistant. The software simply creates a script. Human assistants use their judgment and knowledge to take advantage of opportune situations and dispatch unexpected problems.

If the user has to open a manual to use it, the software has a bug somewhere.

Software should be able to sense when an error has occurred and adjust or repeat processes accordingly.

Today's software operates by brute force; five years from now, users will look back at our best applications and laugh at their primitive, toylike quality. It's as if a contractor advertised a kit for a custom-built house and then delivered a blueprint, a saw, and a truckful of logs.

The first software vendor that comes up with a truly intelligent package will forever change the industry by forcing competitors to start putting smart features into their products rather than just slapping on additional bells and whistles. If myopic manufacturers resist this trend while others turn future systems into true, problem-solving assistants — well, there will always be jobs flipping burgers.

Some trivial examples? Most DTP users haven't a clue about sound page layout and design, and end up producing reams of ugly, unreadable output. A smart DTP package would ask some key questions: "Are you producing a newsletter? A report? A memo?" If you answered *newsletter:* "How many pages will it be, and how many stories of what length would you like to include? What art do you have ready?" It would then display lots of output samples, ask which the user preferred, and make it easy to customize any of them. But it would know rules of good design so that if a user wanted to put headlines in three-inch type and text in four-point italics, or put 12 skinny columns onto an 8.5-inch page, the software would politely suggest a better way.

This doesn't mean that all software has to become Naziware. If a designer really did want 12 columns on a page, the software would happily oblige. It does mean that most users could profit from genuinely intelligent, rule-based help.

While some users relish the control over every pixel that today's applications offer, most would rather have their systems become capable of learning what they like, taking care of all the dirty work for them, and suggesting smart solutions that they might not have otherwise known. An even smarter DTP package would ask a series of questions to sniff out the user's tastes and goals, file away the lessons it learned, and then request all the text and art for a newsletter. It would ask which stories were the most important and then propose a series of possible layouts. It could even offer help with potentially troublesome areas such as writing punchy, pithy headlines, again by asking the right questions to guide the user through the creative process. This isn't all that difficult. Editors and designers who know the rules do it every day.

All of us have endured seemingly endless slide presentations hacked together by well-meaning associates who simply don't know how to concoct an effective presentation. Don't you wish they could use smart software that would help them create riveting graphs or tell them not to put a dozen wordy bulleted items onto each slide?

Just because your system can be better organized than you doesn't mean this kind of help has to be harmful or intrusive.

Computers are terrific at spotting patterns. If you're using a spreadsheet and keep entering the same basic commands over and over, your system should be smart enough to pop up a window that says, "Excuse me, but you can save some steps. If you're really busy at the moment, click on Cancel and I won't disturb you. But if you'd like, I can create a simple one-key macro out of the 20 keystrokes you keep typing and speed up your work considerably." Or if you ended every day by writing a status report to your boss, your system could watch you, figure this out, and remind you gently to do so if one day you lost track of time: "Excuse me, but it's getting late. Would you like to start working on the word-processing document you normally start at this time with 'To: D. Warbucks'?" If you clicked on OK, it would load your word processor and even type in the "To:" and "From:" and "Date:" for you.

Sure, this may smack a bit of 1984 or a dangerous and meddling 2001-esque HAL, but just because your system can be better organized than you doesn't mean this kind of help has to be harmful or intrusive. While most individual users don't have the resources to put this kind of rule-based expertise together, software companies do. And computers are the perfect implementers of such knowledge.

If such smarts were integrated into everyday software properly, most businesspeople would flock to it. CompuServe user Bob Perez agrees that applications should do a lot more constructive, real-world work than they do today. He argues that "advances like these ultimately will do more for the success of the Macintosh than faster chips and smaller boxes."

In fact, Apple had better pay attention to such suggestions. This particular CompuServe dialog was punctuated by repeated and sobering comments that current Mac users aren't wedded to Apple — remember, they're simply looking for cutting-edge, superior solutions.

Here's a typical response that should make Apple sit up and take notice: "I have the money in my hot little hand right now, just begging someone to take it in exchange for a really powerful and useful personal computer. If NeXT ever really turns out, I'll get one Currently I am listening to the developments on the Sun Workstation. If the new package of Sun software begins to mature, I'll buy one of them as well." (And remember, the folks involved in this discussion are currently all dichard Mac users.)

Or another: "I am not 100 percent certain that there will be a Mac in 1995, unless Apple can get back to the cutting edge There are other contenders out there If a contender appears, personally, I'm about ready to jump ship."

What do you *MacUser* readers think? What kinds of improvements would you like to see in the years ahead? And will these come from Apple or some other manufacturer? Drop me a line and let me know.

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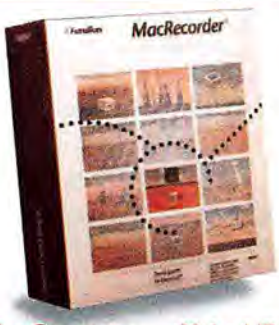
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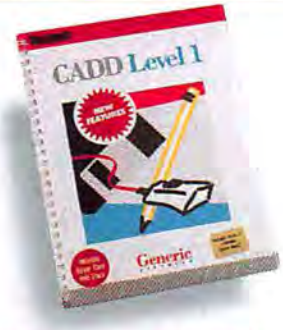
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★PCPC ... 30 day MBG
3175 HFS Backup 3.0 54.
★Solutions, Intl. ... 60 day MBG
3448 SmartScrap & The Clipper 2.0 46.
3449 SuperGlue 1.05 50.
★SuperMac Software ... 60 day MBG
3383 SuperSpool 5.0 53.
3382 SuperLaserSpool 2.0 79.
3378 Multi-User SuperLaserSpool 2.0 .. 199.
3377 Diskfit 1.5 53.
3379 Network Diskfit 1.5 199.
3381 Sentinel 2.0 89.



Olduvai Software
Read-It! OCR 2.0—Pre-programmed and fully trainable OCR for use with any scanner. Creates text files from books, newspapers, price lists, etc. Highest MacUser rating of any OCR software with 4.5 mice $249.

★Symantec ... 30 day MBG
4728 MacSQZ! 1.51 52.
4729 S.U.M. 1.1 65.
5176 S.A.M. 1.0 65.
5171 S.U.M. & S.A.M. Bundle 119.
★Symmetry ... 30 day MBG
3318 HyperDA 1.1 35.
★Williams & Macias ... 30 day MBG
3783 myDiskLabeler w/Color 2.9.1I 31.
3784 myDiskLabeler w/LaserWriter 2.9.1LI . 34.
4976 Sticky Business 1.0.4 99.
Working Software
3788 Findswell 2.0 36.



Miles Computing
The Puzzle Gallery—The author of *Fool's Errand* takes you on a trip to Hazard Park, the last known carnival on earth. See any of the 40 attractions filled with 180 puzzles. Over 4 dozen digitized sounds. Color on the Mac II $27.

★XTree ... 30 day MBG
5177 XTreeMac 1.0 52.

WORD PROCESSING

★Access Technology ... 60 day MBG
3959 MindWrite 2.1 95.
4109 MindWrite*Express* 2.1 139.
★Aegis Development ... 60 day MBG
1133 Word Tools 1.2 42.
Ashton-Tate
1324 FullWrite 1.0 269.
★Deneba Software ... 30 day MBG
4700 BigThesaurus 54.
1767 Comment 2.0 54.
1768 Coach Professional 3.0C 105.
Electronic Arts
1543 Thunder II 1.0 52.
★Lundeen & Assoc. ... 60 day MBG
2684 WorksPlus Spell 2.0 46.
★Microlytics ... 60 day MBG
2733 Word Finder 2.0 33.
4870 Electronic WordFinder 220 79.
★Microsoft ... 30 day MBG
2885 Write 1.0 79.
2882 Word 4.0 255.
★Niles & Associates ... 30 day MBG
5048 EndLink 1.0 59.
4602 EndNote 1.1.1 82.
★Preferred Publishers ... 30 day MBG
4781 Vantage 1.0 59.
★Sensible Software ... 30 day MBG
4692 BookEnds 1.0E 53.
3375 Sensible Grammar 1.1D 53.
★Symantec ... 30 day MBG
3422 More II 2.0 255.
★Symmetry ... 30 day MBG
4504 Acta Advantage 1.0 65.
★T/Maker ... 30 day MBG
3639 WriteNow 2.0 109.
WordPerfect
3800 WordPerfect Mac 1.0.1 $185.
Working Software
3792 Spellswell 2.0G 45.
4693 Quick Letter 1.0 75.

MUSIC & EDUCATION

★Ars Nova ... 60 day MBG
1215 Practica Musica 2.1 75.
★Bogas Productions ... 60 day MBG
4255 Super Studio Session 2.0 75.
1461 Studio Session 1.2 SE 49.
Bright Star Technology
1402 Alphabet Blocks 1.0 32.
3961 Talking Tiles 1.0 69.
Broderbund Software
4314 Type! 1.0 20.
1423 Jam Session 1.1 *(CP)* 30.
1422 Geometry 1.2 *(CP)* 59.
4067 Calculus 1.2 *(CP)* 59.
Coda Music Systems
4367 MacDrums 1.01 *(CP)* 32.
4483 Perceive 1.0 52.
Davidson & Associates
1734 Math Blaster! 1.0 *(CP)* 27.
4978 Speed Reader II 1.0 *(CP)* 36.
Electronic Arts
3941 SmoothTalker 2.1 33.
4619 Mavis Beacon Typing 1.2B *(CP)* ... 35.
1846 Deluxe Music Construction Set 2.5 . 85.
★Great Wave ... 30 day MBG
2277 TimeMasters 1.0 22.
2276 KidsTime 1.2 26.
2270 American Discovery 2.1 27.
4334 NumberMaze 1.0 27.
2273 ConcertWare+ 4.0 39.
2271 ConcertWare+ MIDI 4.0 79.
Learning Company
2670 Reader Rabbit 2.1 *(CP)* 32.



Zedcor ... 60 day MBG
DeskPaint 2.01—Paint/Draw DA gives you full graphic editing power, including auto-trace, air brush, charcoal, and smoothing tools. You'll never have to leave your application to touch up a drawing again $69.

960U
MMC

1-800/622-5472
MacConnection™

MacConnection, 14 Mill Street, Marlow, NH 03456 1-800/622-5472 603/446-7711 FAX 603/446-7791

Wherever you may be,

Mindscape
2748 The Perfect Score: SAT 1.0 $46.
★**Personal Training Sys. ... 60 day MBG**
MacConnection carries the entire PTS collection. A partial listing follows.
4946 Excellerate *(beginner level)* 29.
4852 PageTutor *(beginner level)* 39.
4947 LearnWord *(beginner level)* 39.
★**Simon & Schuster ... 60 day MBG**
3305 Typing Tutor IV 1.2 35.
★**Spinnaker ... 30 day MBG**
2329 SAT Score Improvement 1.0 *(CP)* .. 57.
Springboard
4493 Atlas Explorer *(CP)* 28.
★**Think Educational ... 60 day MBG**
3615 MacEdge II 1.0 *(CP)* 27.
★**Unicorn ... 30 day MBG**
3751 Animal Kingdom *(CP)* 27.
3756 Math Wizard *(CP)* 27.

ENTERTAINMENT

Access Software
4655 World Class Leader Board Golf.... 28.
Activision
4475 Quarterstaff *(CP)* 30.
4486 Manhole 30.
5127 Manhole CD ROM 35.
4592 Zork Zero *(CP)* 35.
Broderbund Software
4099 Shufflepuck Cafe *(CP, air hockey)* .. 24.
4111 Moebius *(CP, adventure & arcade)* . 24.
4229 Where is Carmen Sandiego? *(CP)*.. 27.
4965 Auto Duel *(CP)* 27.
4966 SimCity *(CP)* 27.
1421 Ancient Art of War *(CP)* 27.
4540 Ancient Art of War at Sea *(CP)*..... 27.
Bullseye
1544 Ferrari Grand Prix *(CP)* 32.
4074 P51 Mustang Flight Simulator *(CP)* . 32.
★**Casady & Greene ... 60 day MBG**
2268 Crystal Quest 2.2C 26.
4119 Crystal Quest w/Critter Editor 2.2C . 42.
★**Discovery Software ... 30 day MBG**
4408 Arkanoid 27.
Electronic Arts
1842 Chessmaster 2000 *(CP)* 28.
4064 Chuck Yeager Flight Simulator *(CP)*. 32.



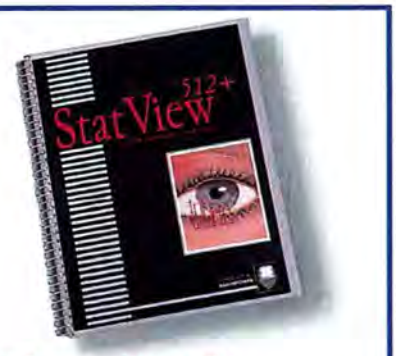
Microsoft ... 30 day MBG
Excel 2.2–New version utilizes up to 8 Megs of memory, allows up to 256 fonts per worksheet, as well as variable row heights, and is 40% faster. Includes a HyperCard based tutorial..... **$255.**

4588 Life & Death *(CP)* $32.
4945 The Hunt for Red October *(CP)*.... 32.
Epyx
2037 Sub Battle Simulator 29.
4660 Sub Battle Simulator for Mac II 29.
MicroProse
4697 Pirates! *(CP)* 32.
★**Microsoft ... 30 day MBG**
2868 Flight Simulator *(CP)* 33.
Miles Computing
2765 Fool's Errand *(CP)**special* 27.
5175 The Puzzle Gallery 27.
2767 Harrier Strike Mission II *(CP)* 32.
Mindscape
4083 Balance of Power 1990 *(CP)* 30.
3987 Colony *(CP)* 30.
4596 Deja Vu II *(CP)* 30.
PCAI
3144 MacGolf 2.0 *(CP)* 35.
4320 MacGolf Classic *(CP)* 54.
4321 Lunar Rescue *(CP)* 34.
4517 Road Racer *(CP)*..... 39.
Sierra On-Line
3397 Leisure Suit Larry *(CP)* 23.
3396 King's Quest III *(CP)* 29.



Chang Labs ... 60 day MBG
C.A.T. 2.0–A lightning-fast relational database for managing your contacts, tracking facts, figures, events, projects, writing letters, and performing mailmerges **$229.**

★**Silicon Beach ... 60 day MBG**
3501 Apache Strike 27.
3503 Dark Castle 27.
3502 Beyond Dark Castle 27.
★**Simon & Schuster ... 60 day MBG**
3303 Star Trek Kobayashi Alternative *(CP)* 24.
Sir-Tech
3347 Mac Wizardry *(CP)* 35.
★**Softstream Int'l., Inc. ... 60 day MBG**
4071 Mac•Man *(w/adapter)* 24.
4072 The Solitaire DA 24.
4073 Colour Billiards 35.
4995 Cribbage Tutor 27.
★**Spectrum Holobyte ... 30 day MBG**
4175 Solitaire Royale *(for Mac SE)* 20.
3464 Tetris 20.
4472 Tetris *(color version)* 24.
3462 PT-109 26.
3459 Falcon 2.0 32.
★**Spinnaker ... 30 day MBG**
2328 Sargon IV *(CP)* 29.
Springboard
4988 Hidden Agenda 36.



BrainPower ... 60 day MBG
StatView 512+–The professional's data analysis package. Includes descriptive and comparative statistics, multi-variate and factor analyses, graphics and more **special $149.**

★**SubLogic ... 60 day MBG**
4698 Jet *(CP)* 32.

NETWORKS & COMMUNICATIONS

★**Abaton ... 30 day MBG**
4589 InterFAX Modem 359.
★**CE Software ... 60 day MBG**
5172 QuickMail *(1 user add-on)*..... 45.
5174 QuickMail *(5 user Pak)* 175.
5173 QuickMail *(10 user Pak)*..... 259.
★**CompuServe ... 60 day MBG**
1676 CompuServe Information Service .. 24.
1673 CompuServe Navigator 2.1 45.
1674 Standard Service/Navigator Bundle 59.
★**DataViz ... 60 day MBG**
1823 MacLink Plus 3.0 139.
4842 MacLink Plus/Translators..... 119.
★**Dove Computer ... 60 day MBG**
4939 FastNet III 450.
4938 FastNet SE 450.
4937 FastNet SCSI 925.
★**Dow Jones ... 30 day MBG**
1785 Desktop Express 1.03 95.
1786 Market Manager Plus 2.0 189.
★**Farallon Computing ... 30 day MBG**
4208 Timbuktu 2.0.1 65.
4866 Timbuktu Remote 1.0.1..... 195.
4867 Timbuktu 30-Pack 2.0.1 1395.
2201 TrafficWatch 1.08..... 139.
2203 PhoneNET PLUS *(DIN-8)* 35.
2204 PhoneNET PLUS *(DB-9)*..... 35.
4869 PhoneNET Connector 10-Pack... 225.
4868 PhoneNET Repeater 325.
2206 PhoneNET StarController 1199.
★**Freesoft ... 60 day MBG**
2219 Red Ryder 10.3 54.
Hayes
2300 Smartcom II 3.1 88.
2307 Smartmodem 2400..... 429.
5170 2400M *(internal)* 419.
5169 2400M *(internal w/Smartcom II)* .. 459.
Insignia Solutions
4089 SoftPC 1.3 249.
★**LaCie, Ltd. ... 30 day MBG**
4975 LaCie Utilities 1.0 *(Includes SilverLining, SilverPlatter, and SilverServer)* 89.



"We're not even close to Duluth."

Dear MacConnection,

My colleagues and I saved our pop cans for 3 months. On Monday, we had over 400—enough to buy *Crystal Quest*. It was time to call.

Reading your ordering instructions, we all laughed at the part about overnight delivery. You see, we're not close to Detroit, Chicago, Milwaukee, or Minneapolis. We're not even close to Duluth. We remember "overnight" deliveries that took 2 weeks.

Well, by 4:00 PM the next day we were already past the 5th wave, dealing with Dumples and Zarklephasers. Thanks for bringing the Upper Peninsula a little closer to the rest of the world.

Melinda Stamp
for the Northern Michigan University
Popcan Consortium
Marquette, MI

1-800/622-5472

MacConnection™

MacConnection, 14 Mill Street, Marlow, NH 03456 1-800/622-5472 603/446-7711 FAX 603/446-7791

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Just for the record, all the ads in this series feature real live MacConnection customers and the real live letters they wrote us. Really!

will set you free.

DISKS

3297 **Sony** 3½" DS/DD Disks $16.
3772 **Verbatim** 3½" DS/DD Disks 17.
2214 **Fuji** 3½" DS/DD Disks 17.
2792 **MAXELL** 3½" DS/DD Disks 17.

3298 **Sony** 3½" HD Disks *(1.44 Meg)* . . . 39.
3773 **Verbatim** 3½" HD Disks *(1.44 Meg)* . 39.
2215 **Fuji** 3½" HD Disks *(1.44 Meg)* 39.
2793 **MAXELL** 3½" HD Disks *(1.44 Meg)* 39.

ACCESSORIES

★Avery ... 60 day MBG
4864 3½" Disk Labels *(Qty. 250)* 13.
4865 3½" x 15/16" Address Labels *(Qty. 3750)* 15.
4811 8½" x 11" Transparencies *(Qty. 50)* 22.
4807 1" x 2⅝" Laser Labels *(Qty. 3000)* . 24.
Bantam Publishing
1403 Complete HyperCard Handbook . . 23.
★Computer Coverup ... 60 day MBG
1723 ImageWriter II Cover 8.
1722 ImageWriter LQ Cover 8.
1725 Mac SE Ext. Keyboard Cover Set . . 10.
4657 LaserWriter II Cover. 10.
★Ergotron ... 60 day MBG
2004 Mouse Cleaner 360° 15.
3992 The Muzzle *(covers power outlet)* . . 62.
2000 MacTilt SE 68.
★Goldstein & Blair ... 30 day MBG
2267 *The Macintosh Bible* (2nd Edition). . 20.
★I/O Design ... 30 day MBG
2379 MacLuggage Imageware II. 49.
2376 MacLuggage Macinware Plus 64.
2381 MacLuggage Macinware SE. 75.
Kalmar Designs
2531 Teakwood Roll-top Case *(holds 45 disks)* 14.
2532 Teakwood Roll-top Case *(holds 90 disks)* 21.
2533 Teakwood Roll-top Case *(holds 135 disks)* 31.
★Kensington ... 30 day MBG
MacConnection carries the entire line of Kensington's accessories. Partial listing below.
2577 Mouseway *(mouse pad)* 8.
2589 Universal Printer Stand 15.
4126 LaserWriter II Cover. 17.



Datadesk ... 30 day MBG
MAC-101 Keyboard–Includes macro program, Masterstrokes, to assign keystrokes and mouse clicks to 15 function keys. Beige, platinum, or ADB version. **$145.**
Foreign keyboards are also available **call**

5021 Space Saving Printer Stand. $17.
2545 Universal Copy Stand 22.
4970 Modem/FAX Protector 10 19.
4971 Modem/FAX Protector 20 25.
4972 Power Tree 10 *(good)* 19.
4973 Power Tree 20 *(better)* 27.
4974 Power Tree 50 *(best)* 54.
2559 Apple Security Kit 34.
2556 Maccessories Anti-Glare Filter. 33.
2568 Maccessories SuperBase 34.
2585 Printer Muffler 80 43.
2586 Printer Muffler 80 Stand 24.
2583 Printer Muffler 132 58.
2584 Printer Muffler 132 Stand 24.
4070 System Saver SE. 52.
2566 System Saver Mac *(platinum)* 64.
2546 Maccessories A-B Box 64.
5064 Apple Color Monitor Polarizing Filter 65.
5065 Full Page Display Polarizing Filter . . 65.
5066 Two Page Display Polarizing Filter . 135.
4941 Mac II Monitor Stand. 65.
4643 Mac II Stand and Cable Kit 65.
2561 MasterPiece Mac II 105.



Dove Computer ... 60 day MBG
MacSnap 2S–Two 1-Megabyte 120ns SIMMs. Will expand a Mac Plus or SE from 1 Meg to 2.5 Meg with room for further expandability up to to 4 Meg. **special $399.**

★MacConnection ... 60 day MBG
4623 Solid Oak Disk Case, made by New England craftsmen *(holds 90 disks)*. . 29.
★Mobius Technologies ... 60 day MBG
4470 Fanny Mac QT 60.
★Moustrak ... 60 day MBG
2694 Moustrak Pad *(standard 7"x9")* 8.
2692 Moustrak Pad *(large 9"x11")* 9.
2693 Moustrak Pad L/F *(9"x11")* 10.
Moustrak Designer Series ea. 12.
Ribbons
3255 ImageWriter II Ribbon. 4.
3261 ImageWriter II 4-color Ribbon 9.
3270 ImageWriter II Rainbow Six Pack. . . 20.
3260 ImageWriter LQ Black Ribbon. 17.
★Simon & Schuster ... 60 day MBG
4230 *The Fully Powered Mac* book 24.
★Sopris Softworks ... 60 day MBG
4016 MacPlus Cover *(navy)* 15.
4171 Mac SE Std. Keyboard Cover *(navy)* . . 15.
4019 Mac SE & Ext. Keyboard Cover *(navy)* . 15.
4017 ImageWriter II Cover *(navy)* 11.
4168 ImageWriter LQ Cover *(navy)* 13.
4018 LaserWriter II Cover *(navy)*. 17.
4012 High Trek ImageWriter II carry case. 49.



Cutting Edge ... 30 day MBG
800k External Disk Drive–Features the latest in technology. Compatible with 512E, Plus, and SE. Includes LED disk access light. Formats disks as 400k or 800k HFS **$149.**

4013 High Trek Mac Plus carry case 59.
4014 High Trek Mac SE & ext. kybd. case 69.
★Targus ... 60 day MBG
3618 ImageWriter II Carry Case. 49.
3617 Mac Plus/SE Carry Case. 59.
4015 Mac SE & Ext. Kybd. Carry Case . . 75.

OUR POLICY

- We accept VISA and MASTERCARD.
- No surcharge added for credit card orders.
- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order.
- No sales tax.
- All U.S. shipments insured; no additional charge.
- APO/FPO orders shipped 1st Class Mail.
- International orders U.S. $250 minimum.
- Upon receipt and approval, personal and company checks now clear the same day for immediate shipment of your order.
- Corporate P.O.s accepted subject to credit approval.
- COD max. $1000. Cash or certified check.
- 120 day limited warranty on all products. Defective software replaced immediately. Defective hardware repaired or replaced at our discretion. All items subject to availability. Prices subject to change without notice.
- To order, call us anytime Monday through Friday 9:00 to 9:00 EST, or Saturday 9:00 to 5:30 EST. You can call our business offices at 603/446-7711 Monday through Friday 9:00 to 5:30 EST.

SHIPPING

Continental US: Barring massive computer failures and other natural or unnatural catastrophes, all credit card orders phoned into MacConnection weekdays by 8 PM EST will ship Airborne the same night for delivery the next business day (i.e. not Saturday or Sunday), except for those within UPS Ground Zone 1 (which is also an overnight service). The total freight charge on any order placed with MacConnection is now $3. Backorders will also ship Airborne overnight at no additional charge. Some areas require an additional day delivery.
Hawaii, Alaska and Outside Continental US: Call 603/446-7711 for information.

our money-back offer

★Lamir ... 30 day MBG

4984 Acknowledge 1.0 $329.

★Microsoft ... 30 day MBG

2875 Microsoft Mail 1.37 (1-4 users). . . . 195.
2872 Microsoft Mail 1.37 (5-10 users). . . 325.
2873 Microsoft Mail 1.37 (11-20 users). . 489.
2874 Microsoft Mail 1.37 (21-32 users). . 639.

★Nuvotech ... 60 day MBG

3000 TurboNet ST *(DIN-8)* 30.
3001 TurboNet ST *(DB-9)*. 30.

★Practical Peripherals ... 30 day MBG

3100 1200 Baud External Modem 77.
3102 2400 Baud External Modem 179.
3089 Mac Communications Pack 1.5 . . 225.

★Shiva ... 30 day MBG

3444 NetSerial X232 289.
4347 NetBridge. 349.
4942 TeleBridge 349.
3443 NetModem V2400 479.

★Software Ventures ... 30 day MBG

3454 MicroPhone 1.5. 119.
3455 MicroPhone II 3.0 225.

★Solutions, Intl. ... 60 day MBG

4308 BackFAX *(reqs. Apple FAX modem)*. 127.

★Synergy ... 30 day MBG

3130 VersaTerm 3.20. 65.
3131 VersaTerm-PRO 3.0. 189.

★TOPS ... 30 day MBG

3723 TOPS Mac 2.1. 149.
3726 TOPS for DOS 2.1 119.
3724 NetPrint 2.0. 119.
4715 InBox Connection Mac 2.2 75.
4714 InBox Starter Kit 2.2 199.
4188 TOPS Teleconnector *(DIN-8)* 39.
4598 TOPS FlashBox. 125.
3725 TOPS Repeater. 129.
3720 TOPS Flashcard 169.

★Traveling Software ... 60 day MBG

3729 LAP-LINK Mac 2.0 83.

INPUT/OUTPUT

Caere

4476 OmniPage 1.1 559.

★Cutting Edge ... 30 day MBG

3988 CE 105ADB Keyboard w/QuicKeys . 135.

★Datadesk ... 30 day MBG

1819 MAC-101 Keyboard *(beige)*. 145.



DataViz ... 60 day MBG

MacLink Plus 4.0–Share information between your Mac and an IBM PC or compatible. Rates of up to 57.6k baud, and over 60 translators insure quick and easy transfers. . . . $139.

MacLink Plus Translators 4.0 119.

1820 MAC-101 Keyboard *(platinum)* . . $145.
1821 MAC-101 Keyboard *(ADB)*. 145.
Foreign Keyboards available. call

★Ex Machina ... 30 day MBG

4843 WristMac 1.0. 149.
5018 WristMac Executive 1.0. 199.

★Kensington ... 30 day MBG

2576 Turbo Mouse for Mac Plus 3.0. . . . 109.
2547 Turbo Mouse ADB 3.0. 109.

Koala

2593 MacVision 2.0 219.

★Kraft Systems ... 60 day MBG

2600 3-Button QuickStick 39.
4082 3-Button QuickStick ADB 51.

Kurta

2604 IS ADB 8½" x 11" Tablet 255.
5161 IS ADB 12" x 12" Tablet 385.
5162 IS ADB 12" x 17" Tablet 625.
2605 Cordless 4 Button Cursor 65.

★Logitech ... 30 day MBG

5082 ScanMan Mac 349.



Software Ventures ... 30 day MBG

MicroPhone II 3.0–The newest version of the top telecom software adds ZMODEM; on-screen color icons; and color & sound support for XCMDs and XFCNs. $225.

★LYNX Computer ... 30 day MBG

1211 LYNX Trackball 65.
1212 LYNX Trackball ADB 65.

★Mobius Technologies ... 60 day MBG

4846 MultiScreen 349.

★Mouse Systems ... 30 day MBG

2808 A+ Mouse 65.
2809 A+ Mouse ADB 85.

★Nutmeg Systems ... 30 day MBG

2992 15" Monitor for Mac PLUS 999.
2994 15" Monitor for Mac SE. 999.
2993 15" Monitor for Mac II 999.
4002 19" Monitor for Mac PLUS 1349.
4096 19" Monitor for Mac SE. 1349.
4097 19" Monitor for Mac II 1449.
4849 LCD Interface *(Kodak DataShow)* . 399.

Olduvai Software

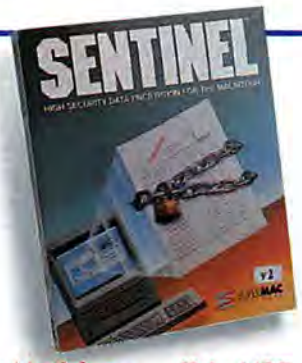
5138 Read-It! OCR Personal 2.0 99.
3034 Read-It! OCR 2.0 249.

★Orange Micro ... 30 day MBG

4488 Grappler Spooler 39.
3036 Grappler C/Mac/GS 2.0 79.
4076 Grappler LQ 1.5 103.
4487 Grappler LS 1.0 103.

★PCPC ... 30 day MBG

5005 SHADOWGRAPH Monitor *(gray scale, incl. CGC/2 Card)*. . . 2895.



SuperMac Software ... 60 day MBG

Sentinel 2.0–Lock up your confidential documents! Sentinel provides the most secure and fast data encryption methods, including DES. Sentinel-encrypted data cannot be compromised by computer viruses. $89.

5004 CGC/2 Graphics Card. 1495.

★PTI/DataShield ... 30 day MBG

4845 MacDirector 115.

SoftStyle

3282 Printworks (Dot Matrix) 3.5 43.
3283 Printworks (HP laser) 3.6. 85.

Summagraphics

4298 BitPad Plus ADB. 325.

★Thunderware ... 30 day MBG

3648 ThunderScan 5.0 with PowerPort . 189.
4994 LightningScan 409.

MEMORY & DRIVES

★Cutting Edge ... 30 day MBG

3989 800k External Disk Drive. 149.
5133 20 Meg Hard Drive. 439.
3990 30+ Meg Hard Drive 499.
3991 45+ Meg Hard Drive 559.

★Dove Computer ... 60 day MBG

1801 SCSI Interface/Port 109.
1807 MacSnap 524E. 189.
1809 MacSnap 524S. 249.
1811 MacSnap 548. 499.
1812 MacSnap 548S. 589.
1800 MacSnap 2SE. 319.
1797 MacSnap Plus 2 319.
1804 MacSnap 2S special 399.
1793 MaraThon 020 MSE1 585.
1794 MaraThon 020 MSE2 *(1 Meg)*. . . . 979.
1795 MaraThon 020 MSE3 *(math chip)* . 779.
1796 MaraThon 020 MSE4 *(1 Meg/chip)* 1159.
4663 MaraThon 030 Accelerator 32 Mhz . 999.
5103 Mac II Power Pack *(includes MaraThon 030 Accelerator, Four DIP SIMMs & RamSnap)* 1799.

★LaCie, Ltd. ... 30 day MBG

4983 Maxcie Internal Drive Kit. 59.
(with Epson 40 Meg, 25ms). 509.
(with Epson 70 Meg, 25ms). 659.
4982 Maxcie External Drive Kit 189.
(with Epson 40 Meg, 25ms). 625.
(with Epson 70 Meg, 25ms). 775.

★PCPC ... 30 day MBG

3177 HD-WSI *(Apple HD-20 to SCSI)*. . . 269.
3189 MacBottom HD 45 SCSI 859.
4658 MacBottom HD 84 SCSI 1249.



MAIL MERGE

Here's a slick question on a slick topic from a Myrna H. Slick of Holsopple, Pennsylvania. Ms. Slick writes, "I can't absorb all of the material in an issue of *MacUser* in one sitting, so I like to put notes on the cover of the magazine for future reference. But sometimes it is almost impossible to write on the cover with a ballpoint pen. Can this be changed?" It sure can: try a Sanford Sharpie Permanent Marker, available at office and art-supply stores everywhere. And write on!

WRITE TO

Letters to the Editor, c/o *MacUser*
950 Tower Lane
18th Floor
Foster City, CA 94404

All letters become the property of *MacUser*, and we reserve the right to edit any letters we print.

COMPILED BY JON ZILBER

Risky Investments

Your April '89 article on investment software is somewhat naive. Although computers are wonderful filing cabinets, news retrievers, and graph makers, there's reason to doubt that using them makes investing any more profitable. Most academic research indicates that no amount of number crunching can improve investment performance, since the price of a security already reflects all known information. In any case, most investment tasks can be handled by a good spreadsheet program.

Carl E. Whitney
Editor, *MicroComputer Stock Survey*
Petaluma, CA

Index Fingered

I frequently need to find an article in my *MacUser* back issues, but it's time-consuming to look through several years' worth of back issues. Is there an index or database of all *MacUser* issues available out there somewhere?

Jo Anne Lagendyk
Montreal, Quebec

You can search for any topic, article, author, or keyword in MacUser *(and other Ziff-Davis computer magazines) on CompuServe; type* `GO COMPLIB` *for more information.* — JZ

Cache in Your Chips

Salvatore Parascandolo's "Efficient Chips" in your January '89 issue provided some good guidelines on sizing a RAM cache but left some questions answered only by assumptions. Does RAM caching really work in the real world? Does it make a difference if you're running from a fast hard-disk drive rather than a slow floppy-disk drive? Are there common programs that have their own cachelike memory management and ignore "external" caching? I have serious doubts that a cache is worthwhile with today's Mac hardware and software.

Doug Miles
Ellensburg, WA

As the article states, caching accelerates only applications that read the disk frequently in the course of normal operations, including database programs such as Reflex Plus and Microsoft File, for example. But if you have a hard disk with an access time of less than 20 milliseconds, the acceleration will be practically unnoticeable. Applications that keep their working (scratch) data in RAM won't be accelerated at all. But if the frequently read data is on a floppy disk, there will be a marked speed improvement. In every case, however, if your task involves opening, closing, and then reopening files, a sufficiently large RAM cache will give you quicker access to a recently closed file. Programs that have to switch among different modes (such as Canvas 2.0's Draw and Paint modes, for example) swap the needed program segments from disk to RAM, which can make the transition bumpy. A small cache can smooth out this process. — SP

Let the Buyer Be Wary-Free

Like Solutions International, Lascaux Graphics also has a money-back guarantee policy like the one Bill Chenault called for in his letter in the March '89 *MacUser*. Most users know what to expect from, say, a word-processing program; such programs differ only in features. Our mathematical and scientific programs do not fit into any standard categories, however, so the customer has no basis for comparison and cannot judge the usefulness of the program without an actual hands-on trial.

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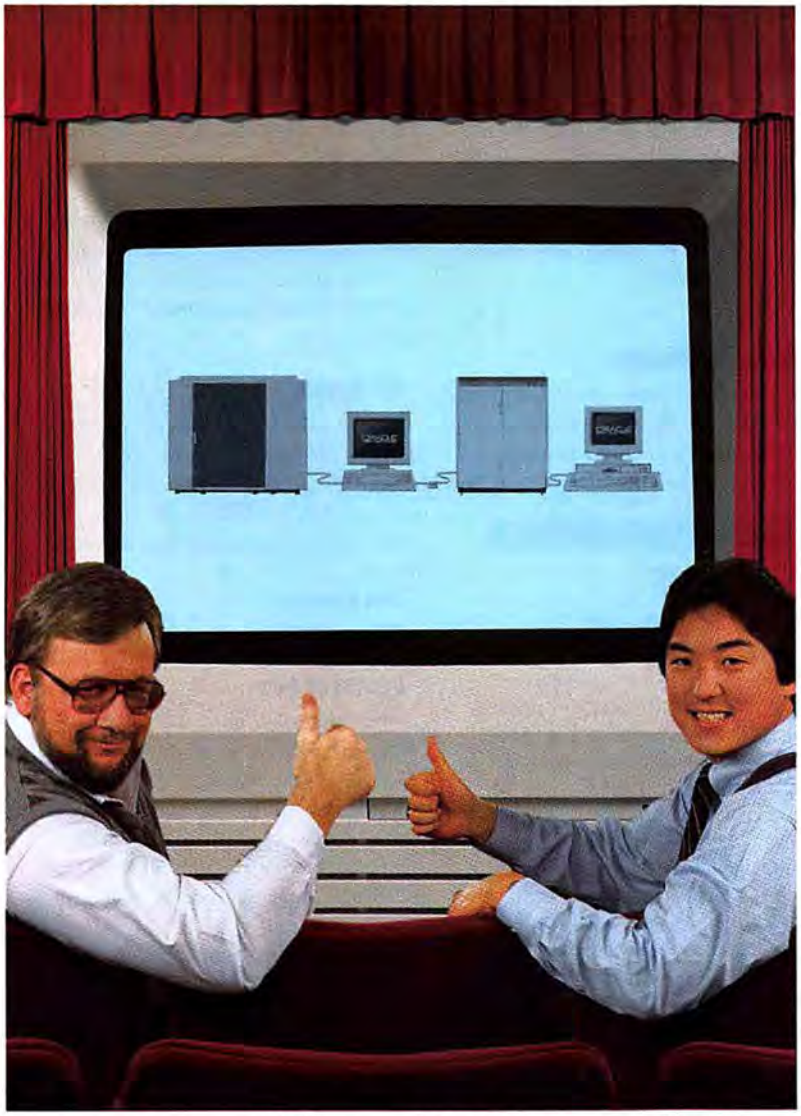
Martin Lapidus
President, Lascaux Graphics
Bronx, NY

Get a Jobs

I read your latest round of Steve Jobs-bashing with interest. This whole business of the conflict between Jobs and Apple Computer reminds me of Robert Heinlein's novel *The Door into Summer*. The plot deals with an inventive genius who loses both his business and his wife to his business manager and travels through time to rectify his problem. Part of the hero's solution is to set up an independent subsidiary to be run on proper business lines with an independent business manager.

Apple and Jobs should enter into a

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partnership like that arranged between General Motors and Charles F. Kettering, the researcher who developed, among other things, the electrical automobile self-starter. Such an arrangement could salve Jobs' ego and give Apple the cutting edge on new technology that it needs to remain competitive.

Steve Jobs is the Thomas Edison of the computer business, but he's no business manager. (Great inventors have a poor record as businessmen, the exceptions being Edwin Land of Polaroid and Bill Gates of Microsoft.) But even if worse came to worst, Jobs could still flog off parts of his NeXT technology to IBM, Xerox, or some other big computer maker. If Apple is smart, it will find some way to make peace with its former wunderkind.

Waleed K. Gosaynie
A.P.O., NY

Multilingual Masses

As a ten-year American resident of Japan, Mac fanatic, and longtime observer of Apple's attempts to enter this market, I found Kristi Coale's article on how Macintosh software is being localized to other cultures ("Multilingual Mac," February '89) intriguing and informative. Her article outlined the brilliant concept of the script manager but was far too complimentary of Apple. Its implementation of foreign operating systems, at least in this market, has been poor — KanjiTalk has been a joke for years.

Curtis Kelly
Osaka, Japan

In Apple's defense, it has recently put a lot of effort into the Japanese market and into pushing KanjiTalk as its test case for nonroman-alphabet interface systems. — KC

Re: Cycling

In two articles referencing Articulate Systems' Japanese-English vocabulary training stack, you have shown a screen that incorrectly displays the word "bicycle" in Japanese as *jitesha;* it should be *jitensha.*

Greg B. Lewis
Osaka, Japan

Overhead Fan

Your editorials have argued that — compared with desktop publishing — desktop presentations should be downplayed or forgotten about. Where I work — in a project office for a government contractor — it is presentations that are all-important, while desktop publishing is hardly used at all.

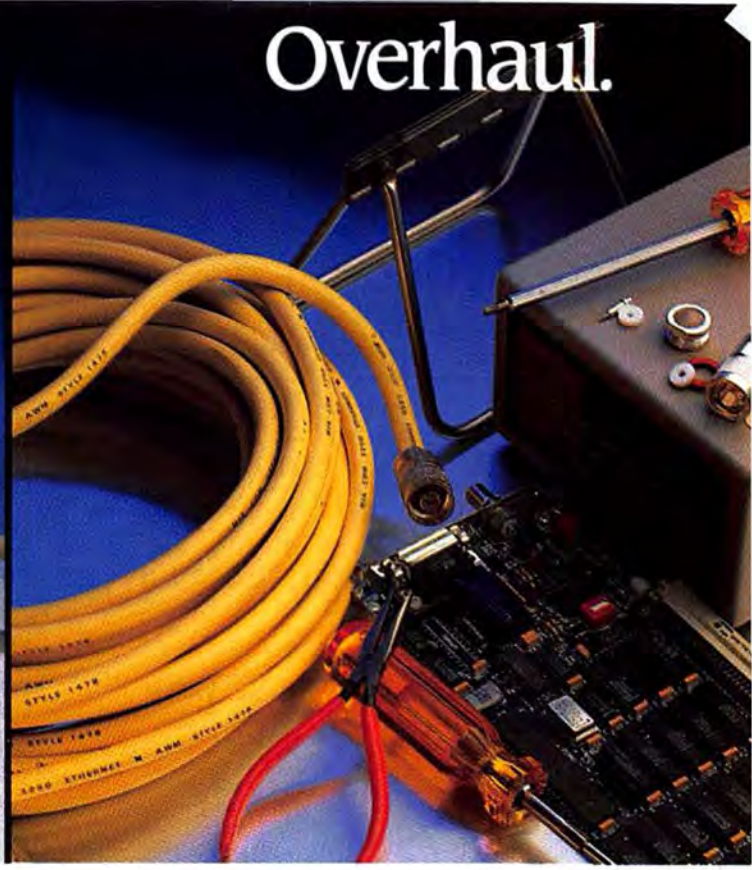
For example, a recent project required us to produce 900 overheads in three days. Instead of sending this out to a vendor at a cost of about $75,000, we did this job in-house with no extra personnel, using PowerPoint.

Aside from a newsletter or two, I know of no use of desktop publishing throughout our division of about 2,500 employees. The available programs cannot satisfactorily handle nitty-gritty details such as automatic figure and table numbering. I suspect that only small companies find desktop publishing so attractive, but com-

Dear Mr. Sculley . . .

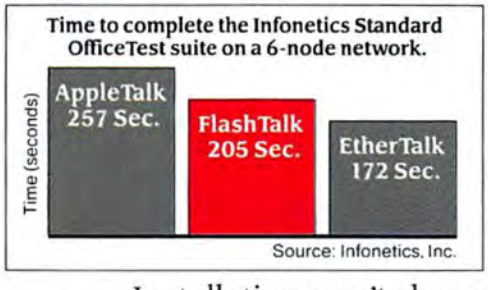
Here's your chance to participate in a monthly open letter to the top brass at Apple Computer. Each month, we'll ask for your opinions on a controversial topic and present a summary of the most interesting responses to the previous questions. Our first topic concerns the future of desk accessories. Rumor has it that DAs will not be supported in future versions of the System; they may become obsolete as early as System 7.0. Presumably, utilities will be supported as INITs, cdevs, and stand-alone applications running under MultiFinder. And, of course, users will have the option of continuing to run under an older System that supports DAs. Nonetheless, such a change could disrupt a smooth transition to the newest system software for many users. What do you think? Send your comments (and your suggestions for future topics) to Dear Mr. Sculley . . ., c/o *MacUser,* 950 Tower Lane, 18th Floor, Foster City, CA 94404.





How to give Ethernet a run for the money.

Some people may think the way to rev up a LocalTalk network is to rip the whole thing out, lay some heavy cable, and send your computers out for an Ethernet implant. Spending big bucks in the process.



TOPS suggests a less traumatic alternative: FlashBox, the fast and easy LocalTalk *upgrade.*

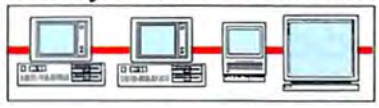
For just $189 per node, FlashBox delivers fully 80% of Ethernet performance for just 20% of the cost. How? By turning your LocalTalk network into a high-speed freeway moving data at FlashTalk rates of 770 Kbps.

Installation won't slow you down either. FlashBox plugs right into the back of your Mac and runs over your existing twisted-pair wire. It's 100% compatible with your current applications. It communicates at FlashTalk rates with PCs using TOPS FlashCard. And, unlike Ethernet, it lets you continue printing to your LaserWriter® without buying a costly gateway.

Best of all, FlashBox is available now. So stop by your nearest TOPS dealer and find out how to rev up your network without overhauling your budget. Or call the TOPS Division of Sun Microsystems at 1-800-445-TOPS, extension 106 (from outside the U.S. and Canada, call 1-415-769-8700, ext. 106).

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Actual performance of your network may vary depending on the quality and length of network cable, network size and configuration. To achieve best performance, you should connect a FlashBox to each Macintosh. Using FlashBox with bridges, gateways, or other AppleTalk-only devices may require network reconfiguration or the addition of repeating devices.

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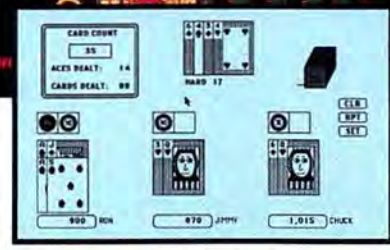


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panies large enough to have their own publishing departments — those with more than about 500 to 800 employees — find more value in desktop presentations.

Phil Sumner
Princeton, NJ

Casting a Spell

Congratulations — you swim nicely against the flow of modern usage when it comes to programs that check spelling. I refer to the plethora of advertising for "spell checkers." Really, I want to test only the spelling of my words and have no use for anything that checks spells, or any other form of black magic. At *MacUser*, the flag flies bravely; you continue to call them spell*ing* checkers.

Ian Carmichael
Maidstone, Australia

Accounts Recedable

Chicagoland readers should watch for late-night TV ads for a hair-replacement clinic that invites everyone to drop in and try its *comb-puter*, a Mac SE running some painting program that shows the potential customer's face before and after a hair-replacement procedure. The commercials make the new hair look kind of fake and fluffy, but the computer comes off quite impressively.

Mark Hardy
Glen Ellyn, IL

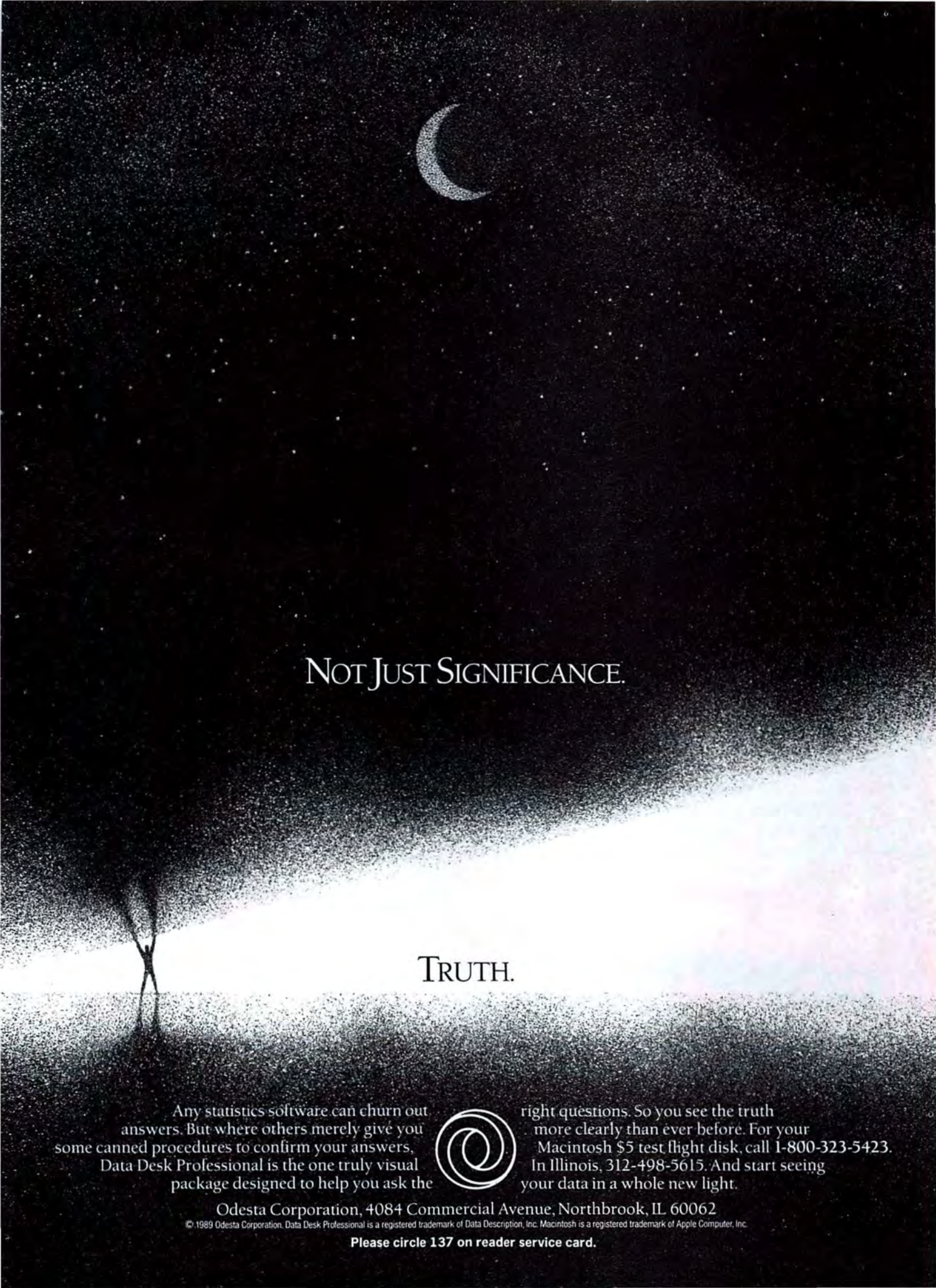
CLARIFICATIONS

Illegal Deduction

Tax Stacks was mentioned in April's "Mac Tax Force" feature but was inadvertently deducted from the directory on page 105. Tax Stacks lists for $69.95 and is published by StackWorks, P.O. Box 426, Urbana, IL 61801; (217) 328-5257.

Sooner Is Better

SuperMac Technology's Spectrum/SE video card for the Mac SE/30 should be shipping by the time you read this. An incorrect expected ship date was cited in the article "Much Ado About Something" in the March '89 issue.



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Xerox Rediscovers the Mac

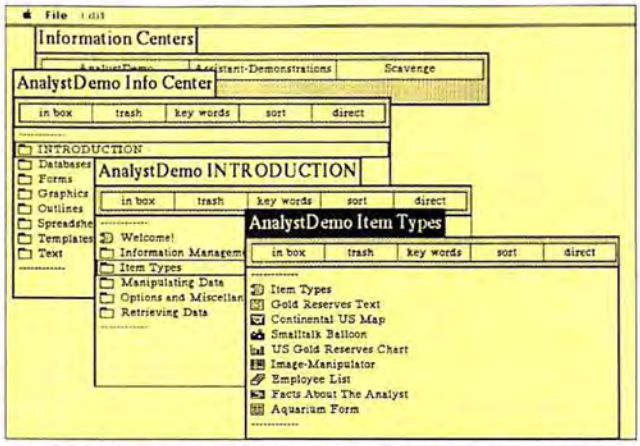
As most people know by now, the Mac's technology was pioneered at Xerox's Palo Alto Research Center, but Xerox fumbled. Since then, the company has stayed out of the Mac market. Now it's back with a vengeance.

Xerox Special Information Systems (SIS) is introducing Analyst, an integrated workstation package, developed in Smalltalk-80, that exceeds every other integrated Mac package by several orders of magnitude. Analyst combines a hypermedia approach to accessing files with word processing, DTP, forms generation, maps, geographic databases, graphics, charts, spreadsheets, outlining, databases, expert systems, and PostScript printing. And if these aren't enough, the system can also be customized with Smalltalk-80.

Analyst uses a somewhat familiar windows environment, with plenty of pop-up and hierarchical menus. Navigating through Analyst is similar to working in the Finder, but with many enhancements. For example, you can conduct text searches and open documents directly out of the search, even if the search leads you to a document created in a different application. You can also use Xerox's Assistant, an add-on package, to create an expert system to show you links between files.

The program's level of integration and power is staggering. In the spreadsheet program, you can perform normal spreadsheet operations, but every cell can contain any Smalltalk-80 object, so a cell can hold images, files, pop-up menus, and even entire databases — and they can function just like any other standard spreadsheet entry.

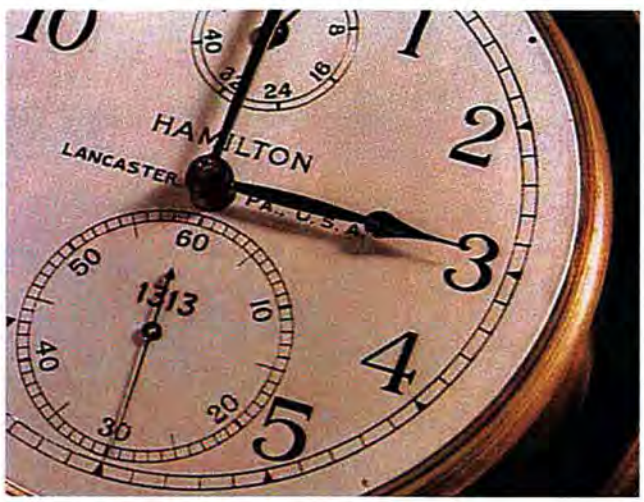
You can create forms for entering data into a database, and if you copy a form into a word-processing document, it doesn't merely paste in as a graphic. Instead, it retains its properties as a data-entry device, so characteristics such as tabbing order remain intact.



Not everyone will need Analyst's workstation-grade power, but there's no question that Xerox SIS has defined a new level of Mac software. Analyst lists for $1,095; its add-ons, Assistant, an expert-system shell for use with Analyst's hypermedia file management, and HUMBLE, a full-blown expert-system shell, list for $495 and $395, respectively. Analyst re-

Kodak Color Comes to Computing



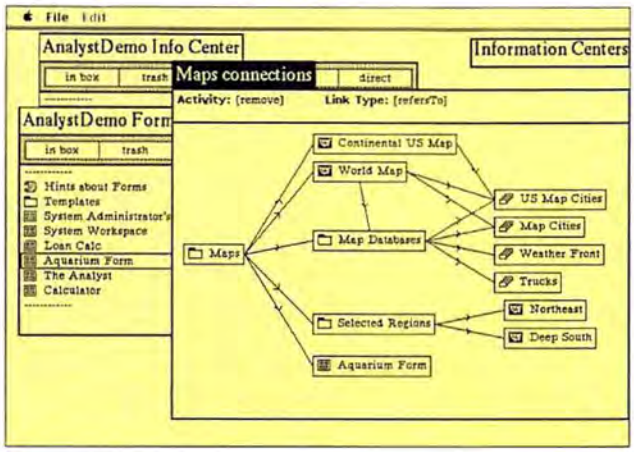


These aren't photos. They're output from the Kodak SV6500 still video printer. The watch was transmitted across country via phone, received on a cellular phone, sent through Kodak's transceiver, and printed.

For everyone who's been waiting for photographic-quality color output from a Mac, the wait may be over, and who better to bring it to an end than Kodak?

The Kodak SV6500 still-video printer has been on the market for nearly two years, but the company is only now introducing a Nu-Bus interface kit for the Mac II. The SV6500 has a 512-x-512-pixel frame buffer with 8 bits per color and prints to Kodak's special Electronic Print paper, which comes in 4-x-5.25-inch sheets. The software lets you print a file in the center of a page, but if the image is larger than the paper or screen, the program can automatically scale your document to fit the paper's 4-to-5 aspect ratio or print a section of the file in actual size. Kodak estimates the time to

EDITED BY RUSSELL ITO



Xerox's Analyst is a workstation-level integrated program for the Mac. Information Centers, like those shown here, are like the Finder crossed with HyperCard.

quires Smalltalk-80 2.3 for Mac II (available from Xerox for $995), a Mac II with at least 5 megabytes, and a hard disk with at least 9 available megabytes (those are just for the application's files; you'll need more disk space for working room and Smalltalk-80).

To find out more, contact Xerox Special Information Systems, Vista Laboratory, 250 N. Halstead St., P.O. Box 5608, Pasadena, CA 91107-0608; (818) 351-2351.

— Russell Ito

download a file to the buffer and print at 160 seconds.

The SV6500's 120-dpi resolution is deceptive, because the prints actually look much sharper than that. Since the SV6500 lays down continuous-tone, rather than dithered, patterns, the perceived resolution is well over 300 dpi. The printer requires 32-bit QuickDraw and handles only bit-mapped images, so it works with color TIFF and PICT2 but not with PostScript.

The color process is similar to conventional photography. The printer puts three layers of dye (cyan, yellow, magenta) onto the paper in varying amounts, overlays them with a special thermal coating, and applies heat so that the thermal layer bonds the dyes together. (Kodak estimates the color stability at ten years.) The result is a print that looks nearly as good as a color photograph.

With its internal frame buffer, the SV6500 can also serve as an input device. You can feed RGB or NTSC video directly into the buffer for downloading into your Mac as a 32-bit color TIFF or PICT2 image.

Currently, the SV6500 can print only to Kodak's special paper, which isn't particularly cheap at $112 per 100 sheets, although that price includes the toner cartridge. The SV6500 lists for $4,800, although the cost of the Mac II interface kit hadn't been determined at press time. To find out more, contact Eastman Kodak, Electronic Photography Division, 343 State St., Rochester, NY 14625; (800) 445-6325, ext. 110.

— Russell Ito

NEWS LINE!

EDITED BY GIL DAVIS

Clones Come to Comdex

CHICAGO — Two Macintosh clones made their first public appearance in the U.S. at the April Comdex show. A Macintosh Plus clone displayed by Akkord Technology of Taiwan featured a 14-inch monochrome monitor atop a small, flat case that housed what Akkord president Lloyd Chen described as a custom-designed logic board, and included several extra ports not available on the Plus: a parallel printer port, two ADB ports, and a monitor jack. Chen said his Plus clone will sell for slightly less than the street price of a new Plus and will ship shortly after it receives FCC approval — expected by August. The clone will initially use Apple's 128K ROMs, which Chen said he is reverse engineering for use in Akkord's computers. Also in Akkord's booth was a laptop conversion kit that requires a user-supplied Macintosh logic board to drive its built-in LCD screen. The kit, which should cost between $2,500 and $3,000, will weigh 14 pounds with a two-hour battery pack.

In another booth, Powder Blue Computers of Salt Lake City showed a $3,119 (dealer cost) Macintosh-compatible computer based on a Macintosh 128K logic board attached to a 16-megahertz, 68020-based accelerator board providing Mac II–like performance. The computer was housed in an IBM PC/AT-style case, which also contained a proprietary high-speed SCSI port and a 65-megabyte hard-disk drive. Attached were a 14-inch monochrome monitor and an extended keyboard.

Novell and Excelan Merging

PROVO, UTAH — Excelan is expected to become a subsidiary of Novell in June, making the combined companies third in network sales behind DEC and IBM and ahead of 3Com. Novell also announced that it's working with Fox Software to develop a database server for Fox's database software.

Adobe Banks on ATM

MOUNTAIN VIEW, CA — Adobe has announced Adobe Type Manager, system-level software that enables Macs to use Adobe-licensed printer fonts to display large type on-screen without the jaggedness typical of scaled-up screen fonts. Its operation is transparent to the application software. Non-PostScript output devices may also be able to take advantage of this new technology. Adobe Type Manager is expected to ship by the third quarter of '89.

Thin Bits . . . Orange Micro has purchased the Macintosh product line of **AST Research,** which includes the Mac 86 and 286 boards, the ICP serial port board, and NuView, a video-capture board . . . **MicroPro International** has sued **Challenger Software** for alleged nondelivery of a previously announced version of WordStar for the Mac . . . **Sony Corporation of America** is now supplying Apple with 40-megabyte, 3.5-inch hard disks

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NEWS LINE!

Speaking Out: Color QuickDraw

Apple's 32-bit color QuickDraw System software upgrade extends the number of colors that are directly supported by Apple System software from 8 bits (256 colors) to 24 bits (16,777,216 colors), with the remaining 8 bits reserved for future third-party and Apple features. The upgrade has been seeded to developers and should be released to users shortly. We asked industry leaders for their reactions to the photorealistic images provided by the new QuickDraw.

"This is the same kind of dramatic development that happened when the Mac took us from typewriters to PostScript-based printers — suddenly we could create anything we'd seen on a sheet of paper. Now we'll be able to enjoy the subtle shading that's present all around us in the images we create."

Robert Gaskins, Director and General Manager, Microsoft's Graphics Business Unit

"The most immediate impact of 32-bit QuickDraw is that it allows Macs, for the first time on any PC, to produce photorealistic images. Many people will take their existing Mac IIs, add a True Color video board and monitor, and begin producing a color document right in their own offices. Others will realize that it's better to spend $10,000 on a Mac-based color DTP system than on a single color spec sheet or brochure."

Steve Edelman, Chairman and Chief Scientist, SuperMac Technologies

"This is about the greatest thing that could happen for the Mac marketplace. It will make the market for 32-bit hardware and software explode. The hardware market will come to expect panning, zooming, and the virtual desktop as the minimum capabilities."

Keith Sorenson, President, RasterOps

"32-bit color is basic to doing the kind of complex computer imagery that people want in a wide range of applications. Photorealistic 3-D images use a technique called texture mapping that covers 3-D shapes with a 2-D texture. That 2-D texture must be produced in 24-bit color to have the realism necessary to produce computer graphics that can be used in commercial environments."

Alvy Rey Smith, Executive Vice President, Pixar

"Looking at pretty pictures is important, but it's just the tip of the iceberg for the Macintosh. We expect 32-bit QuickDraw to enable TrueVision to launch video products so the Mac can be used as a high-level workstation in many more professional environments, such as television animations, integrating live video and computer-generated graphics, high-quality 3-D graphics, and high-definition CAD."

John Tondra, Manager of Customer Support, TrueVision

Apple and the Law

Apple's lawsuit against Microsoft and Hewlett-Packard, as I write this, is midway between its two phases. The first issue was whether a 1985 licensing agreement between Apple and Microsoft was, in itself, sufficient grounds for the dismissal of Apple's copyright-infringement suit.

Presiding Judge William Schwarzer held that it was not. His ruling in the matter, however, does not necessarily constitute the clear-cut victory that Apple and some analysts have claimed it to be. The judge held that the 1985 agreement did not create "a blanket license the limits of which are defined only by the limits of the ingenuity and skill of programmers."

He acknowledged the validity of the agreement and the grant of specific rights to Microsoft, however, while holding that "the agreement is not a complete defense to the infringement claims against Windows 2.03." He also stated that "the issues of infringement and of whatever other defenses may be available to Microsoft must be deferred for resolution in the next phase of the litigation."



ILLUSTRATION: KEVIN O'SHEA

A favorable ruling for Microsoft would have ended the matter entirely, but Judge Schwarzer's ruling in the first phase doesn't constitute a major victory or defeat for either litigant. It simply determines that, in the opinion of the court, it was possible for Microsoft to do something with Windows 2.03 that was not licensed under the 1985 agreement.

What remains to be determined in the second phase of the trial can be summed up as follows:

- Exactly what intellectual-property rights (in the form of copyrights) does Apple validly own?
- To what extent do Microsoft Windows 2.03 and Hewlett-Packard's NewWave make use of intellectual-property rights validly owned by Apple?
- To what extent does any use of intellectual-property rights validly owned by Apple and used in Windows 2.03 or NewWave go beyond what was covered by the 1985 agreement?
- What is the monetary value of any use of rights by the Microsoft and/or Hewlett-Packard products in question, beyond those granted in the 1985 agreement?
- If there is substantial value to valid Apple rights subjected to unauthorized use by Microsoft or HP, what monetary or injunctive relief should be provided to Apple by the court?

Although it is possible, albeit unlikely, that all this may be decided by the time this column appears, we can at least consider the range of possible outcomes and their likely impact on Apple.

At one extreme would be a ruling of the sort Apple is obviously seeking: a ruling that Apple does, indeed, hold valid intellectual-property rights in the Macintosh interface; that Windows 2.03 and NewWave make use of these rights in ways that go substantially beyond the 1985 agreement; and that the monetary value of such use by Microsoft and Hewlett-Packard is large (in the tens or hundreds of millions of dollars), with a substantial monetary award of damages to Apple and an injunction against the continued sale of Windows 2.03 and NewWave.

Such a result would give Apple an enormous advantage against competitors. Were Apple's very broad interpretation of the company's rights upheld by the court, not only Windows 2.03 and NewWave but also Windows 286 and 386, the OS/2 Presentation Manager, and the OSF/Motif graphical user interface for UNIX would be in deep trouble. Apple would be able to prevent their sale and use or, at least, demand substantial royalties for them.

At the other extreme would be a ruling that Apple's copyrights were improperly granted in the first place, since the basic concepts and screen display of the Macintosh were previously developed at Xerox PARC and elsewhere and/or were already in the public domain. This could even pave the way for Macintosh clones. Almost as extreme would be a ruling that although Apple did have valid intellectual-property rights, they were not violated by anything in Microsoft Windows 2.03 or Hewlett-Packard's NewWave. Although Apple, citing case precedent in copyright law, has argued that the Macintosh interface should be viewed in its entirety, both the question of prior work borrowed in developing the Mac and the certainty that Apple granted rights to Microsoft in the '85 agreement require a virtual dissection of the interface into its components.

In spite of the risk of sticking my neck into a noose by offering an opinion on a matter that could be decided by the time you read this, I'm inclined to doubt that the outcome will do Apple much good. Any time the courts are involved, the outcome of a disagreement is ambiguous. My best guess is that — despite the chorus of comment favorable to Apple immediately following the ruling on the first phase — it isn't very likely that Apple will win big on this one, and there is a very good chance that Apple will lose on a grand scale with Macintosh clones, more competition, and lower prices across the board as a result. Apple's loss could be the consumer's gain.



By William Zachmann

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A la ModaCAD

With apologies to Cole Porter:
The world's gone rad today,
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If you can hack today,
right on your Mac today,
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Almost anything goes, design-wise, with ModaCAD, an integrated system of five modules that covers all aspects of the apparel industry, from conception and design to materials costs. The five modules, Design, Textile Design, Patternmaking and Grading, Marking, and Data Management all include computer-aided-manufacturing (CAM) applications and can be purchased individually or collectively.

The Design module is a 24-bit color program with more than 400 special effects and drawing tools. In addition to the color painting and drawing tools you'd expect, there's also a photo-retouching mode for scanned images. The program's five methods for color registration include the Pantone Matching System. Fabric simulation lets designers stretch fabric as well as add pleats and folds. Perhaps the most important function is ModaDRAPE, a surface-mapping mode that simulates how the finished garment will fall.

The Textile Design module lets designers weave fabric on-screen. All weaves can be simulated, and the system double-checks to make sure that the fabric being created is within the capabilities of current looms.

Patternmaking and Grading takes a garment's design and translates it into a flat pattern. It opens pleats and darts, incorporates seam allowances, and grades automatically for up to 255 sizes.

The Marking module minimizes fabric waste by at least two to five percent, according to ModaCAD. The Data Management module is the accountant and production manager, generating spec and cost sheets, keeping tabs on suppliers, and estimating labor costs. If you change the buttons to plastic and raise the hem half an inch, this module will automatically update your costs.

Fashion is always in style, but it has a price. ModaCAD's modules list from $5,000 to $10,000 each, so this product isn't for the Simplicity set. ModaCAD also packages combination hardware/software systems to suit specific needs for $15,000 to $30,000. To find out more, contact ModaCAD, 1954 Cotner Ave., Los Angeles, CA 90025; (213) 312-6632.

— Russell Ito



ModaCAD is an integrated professional-level CAD system for the fashion industry. The woven fabric at the bottom was created in the Textile Design module and then draped in the Design module, which simulates the fabric's weight, texture, highlights, and shading.

Monitoring the Display Scene

This may be the "year of the CPU," but you won't get far without a monitor and display card. Fortunately, new developments on the visual scene are keeping pace with the ongoing expansion of the Macintosh family.

At the lower end of the spectrum, Mobius Technologies has introduced a video card for the SE called MultiScreen, which works with budget monitors such as Samsung's new full-page display, NEC's Multisync GS, Princeton's Max-15, and Apple's 12-inch monochrome. Features include display of multiple resolutions on the same screen, display of two screens at once (the SE's and the external monitor's), and programmable-logic-array technology (for later upgrades). MultiScreen ($495) is available from Mobius Technologies, 8020 Adeline St., Oakland, CA 94608; (415) 654-0556.

Meanwhile, RasterOps, which is best known for its color displays, has entered the monochrome market with a 19-inch model, the ClearVue II, for the Mac II ($2,495). At the same time, it's introduced the new 8-bit ColorBoard 108 ($1,595), which can display up to 256 colors or shades of gray. It provides 640-x-480-pixel resolution on a 16-inch monitor and 1,024-x-768-pixel resolution on a 19-inch monitor. A version of the board with a Pan and Zoom option ($1,890) provides hardware pan and zoom capabilities, and a version with an Extended Desktop Option ($2,090) includes pan and zoom as well as a virtual desktop and pop-up menus. For more information, contact RasterOps, 10161 Bubb Road, Cupertino, CA 95014; (408) 446-4090.

And for 68030 fans, MegaGraphics has announced the 3008, an 8-bit system that provides 256 simultaneous colors or grays for the SE/30 at a price of $1,895. The board works with either a 19-inch Trinitron color monitor (available from MegaGraphics for $4,395) or a 19-inch gray-scale monitor. It provides 1,024-x-826-pixel screen resolution at 75 dpi. The company plans a lower-resolution version that will work with 640-x-480-pixel monitors, such as Apple's color monitor. Contact MegaGraphics, 439 Calle San Pablo, Camarillo, CA 93010; (805) 484-3799.

— James Bradbury

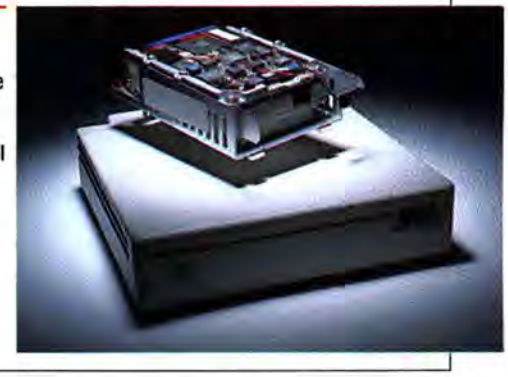
Rodime Reduces Memory Mass

When Apple introduced the IIcx, that was good. When it announced that that computer — as well as the SE and SE/30 — could accept only 3.5-inch hard-disk drives, that was bad. Users cringed at the thought of limited storage horizons — or, worse yet, being limited to Apple's limited storage horizons. Fortunately, that may not need to be the case. Rodime has just announced a new line of 3.5-inch internal hard-disk drives, the Cobra series, ranging in capacity from 45 to 215 megabytes. (External versions are also available.)

Rodime boasts of access time in the 18-millisecond range, with 16K worth of look-ahead caching and a data-transfer rate of 12 megabits per second.

The Cobra series of drives will be available through Rodime's usual resellers. To find out more, contact Rodime at 851 Broken Sound Parkway, N.W., Boca Raton, FL 33487; (407) 994-5585.

— Russell Ito



For anyone who thought 3.5-inch hard drives meant minuscule capacity, Rodime has introduced the Cobra series, a line of internal and external 3.5-inch drives with capacities up to 215 megabytes.

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Faxes Leave the Singles Scene

Fax modems aren't limited to single-user operation anymore: a large group can now use a single fax modem and a single phone line. Solutions, maker of Glue and BackFAX, has unveiled plans to allow the use of a single fax modem among many people over a network, using its new FaxGATE software.

In conjunction with Microsoft Mail 2.0, which should be shipping by the time you read this, FaxGATE lets a user send a fax from a Macintosh to a Microsoft Mail server for transmission. With the help of Microsoft Mail, received faxes can be easily routed to the right people.

Solutions can be contacted at 30 Commerce St., P.O. Box 783, Williston, VT 05495; (802) 865-9220.

— *Stephan Somogyi*

Another One for the Road

The long wait for a portable Mac has helped sustain interest in a variety of "next-best things," from WristMacs to Wizards. Now Cambridge North America has introduced a 2-pound MacLite, which, it boasts, is like "having a 2-pound Mac wherever you go."

"Lite" it may be, but it's actually closer in lineage to the Timex-Sinclair computer, which, like the MacLite, was designed by Sir Clive Sinclair (Britain's equivalent of Jobs and Wozniak rolled into one). The MacLite is a special version of Cambridge's Z88 laptop, and, unlike some of its pricier competitors, it has been tailored for varying degrees of compatibility with common Macintosh applications such as MacWrite, Excel, and HyperCard. It can't run any of these programs, but it can exchange data files between them and its own built-in, ROM-resident applications.

The computer measures 8.25 x 11.5 x .875 inches, and its display is 8 lines x 106 characters. For $849, you get the computer, 128K of RAM, a Z88-to-Mac cable, a word processor, a spreadsheet program, and a HyperCard stack for your real Mac that can exchange information with the portable. Memory can be expanded up to 1.5 megabytes through the use of 512K memory modules.

For further information, contact Cambridge North America, 615 Academy Drive, Northbrook, IL 60062; (800) 336-0088 or (312) 564-5077.

— *James Bradbury*



PHOTOGRAPHY: PETER ALAN GOULD

MacLite is really a Cambridge Z88 laptop bundled with Mac-compatible cables and software. At less than 2 pounds, it's a low-cost alternative to DOS laptops.

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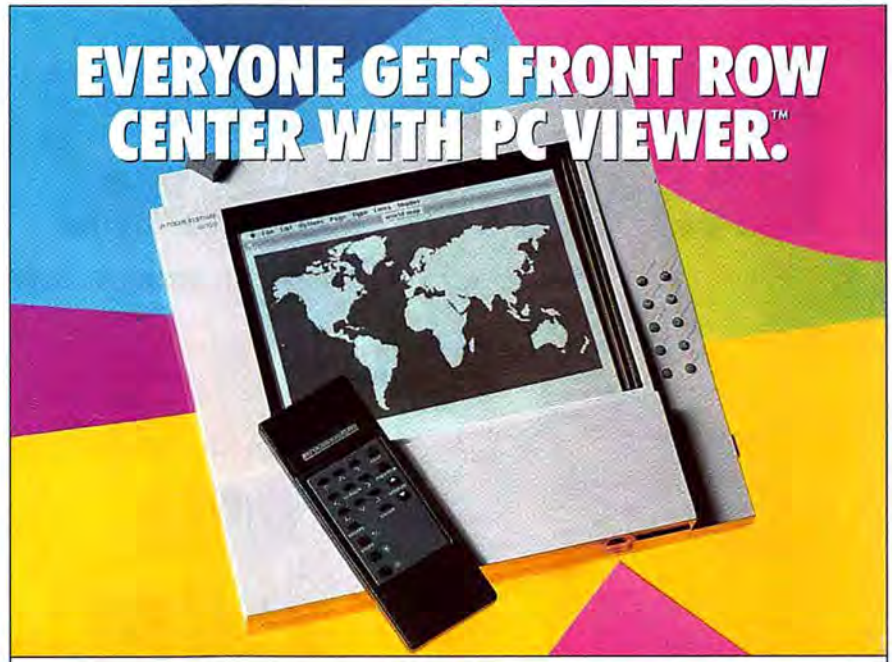
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New Dimensions in Presentations

Creating an eye-catching presentation can require substantial artistic skill with several programs. Visual Business No. 5 (VB5 for short) is a software package that reduces the skill level necessary for creating visual feasts. In addition to having "standard" presentation talents, the VB5 can automatically create true 3-D charts and 3-D text effects.



Visual Business No. 5 created this line chart in full-color 3-D from spreadsheet data. The chart can be rotated to any degree, and the axes, lines, and text follow suit.

A chart begins with manually entered or imported data (saved in SYLK format) from applications such as Excel or other spreadsheet programs. After data entry, you select the type of 3-D graph you want, and VB5 creates it, after which you can rotate the chart and its text, together or independently, along any axis. Charts have true depth when viewed from any angle. The spreadsheet limits are 256 columns by 2,500 rows, and each data item can be up to 30 characters long. Text can be typed and then tilted and rotated as if it were on a movable glass pane, obeying all the laws of perspective.

VB5 has basic object-oriented drawing tools and offers color selection from the standard color wheel or from its own RGB, CYMK, or HLS (Hue, Luminance, and Saturation) models. It can import images in PICT, PICT2, and EPS formats and layer graphics to form a composite. Its output is in full 24-bit color (giving you 16.7 million colors), which means you can produce subtle and stepless color transitions between any two colors or with a third, intermediate, color.

Although it can stand alone and print to a variety of Mac output devices without additional software, adding an optional Output Manager program augments VB5 with electronic slide sorting, printer management, and an image rasterizer that produces high-quality images on a broad range of film recorders and thermal printers. The Output Manager lets you produce special text effects without resorting to bit-mapped text or being limited to a few fonts. Initially, the $295 Output Manager will be bundled free with VB5 and should be available by the time you read this. Interested in converting some 2-D dollars into 3-D presentations? Visual Business No. 5 is $395 and is available from Visual Business Systems, 700 Lake St., Suite H, Ramsey, NJ 07446; (800) 462-3483.

— Salvatore Parascandolo

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A Grabber from Great Britain

With most of our TV sets and all our VCRs crossing the ocean from Japan, Korea, and Taiwan, imported video equipment isn't usually news. But it's surprising when that gear comes from someplace other than the Pacific Rim. Advent Computer Products is now importing a gray-scale frame grabber from England: the Neotech Image Grabber.

The Image Grabber comes in two configurations: Image Grabber SEBus and Image Grabber NuBus. Unlike many of its competitors, the Image Grabber works with the SE or Mac II line (an SE/30 model is being contemplated). It's an 8-bit board, so it can capture images in up to 256 grays, at a resolution of 640 x 480 pixels. It can work with an external gray-scale monitor for real-time digitized video display, and the NuBus unit can actually display the captured image and the real-time video simultaneously on the same screen. The captured image can be saved as a TIFF, RIFF, EPS, PICT, PICT2, PostScript, or MacPaint file.

One of the Image Grabber's most interesting features is its ability to delete the color video signal (also known as chroma). For normal composite video, it has a software-switchable filter to chop the chroma out; for Super VHS (SVHS), Neotech is bundling a cable with the Image Grabber that lets you take advantage of SVHS's separate luminance and chrominance signals by tapping the luminance alone.

The Image Grabber SEBus lists for $1,249, and the NuBus model costs $1,499. To find out more about this latest British invasion, contact Advent Computer Products, 449 Santa Fe Drive, Suite 213, Encinitas, CA 92024; (619) 942-8456.

— Russell Ito



Video from across the other ocean. Advent Computer Products is importing the Neotech Image Grabber from England. This 8-bit gray-scale frame grabber comes in models for the Mac II and SE.

PHOTOGRAPHY: PETER ALAN GOULD

A Penny-Wise Plotter

Most plotters are large in size and high in price, but Gerard Research is out to change that. Its D-size single-pen plotter is big enough to handle large architectural drawings, but, at a list price of $2,395, it's about half the price of many of its competitors.

The GRI ProPlotter is an RS-232C-interfaceable freestanding unit intended for smaller architectural or CAD companies that normally have to turn to a blueprint shop to print their drawings. The maximum drawing size is 22 x 34 inches, and the output medium can be bond paper, vellum, or Mylar. The plotter is compatible with the Houston Instrument DMP-series plotters and runs the DM/PL command set.

For additional information, contact Gerard Research, 46745 Fremont Blvd., Fremont, CA 94538; (415) 651-0217.

— Russell Ito

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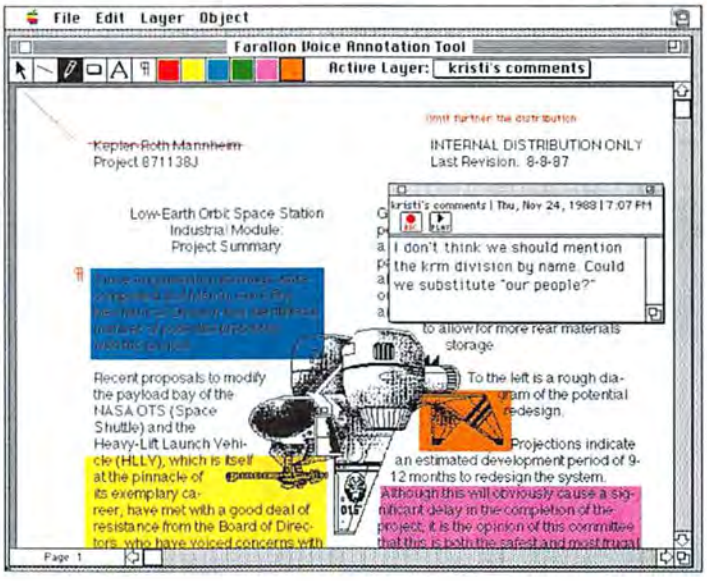
Editing on hard copy has its advantages — you can scribble notes on the text, keep your comments with the document, and show exactly what you want to change right on top of the original text. Performing this same feat on the Mac, however, involves a few more steps than just writing on the copy — until recently. With Annotator from Farallon, not only can you edit an electronic document as you would a hard copy, but you can also add sound to your comments — something you can't do with a red pen and a Post-it.

When used in conjunction with MacRecorder, Annotator lets you record comments and save the sound files with a specific document. You can also make distinctions among written comments by assigning colors or by separating them onto different layers, creating an overlay effect.

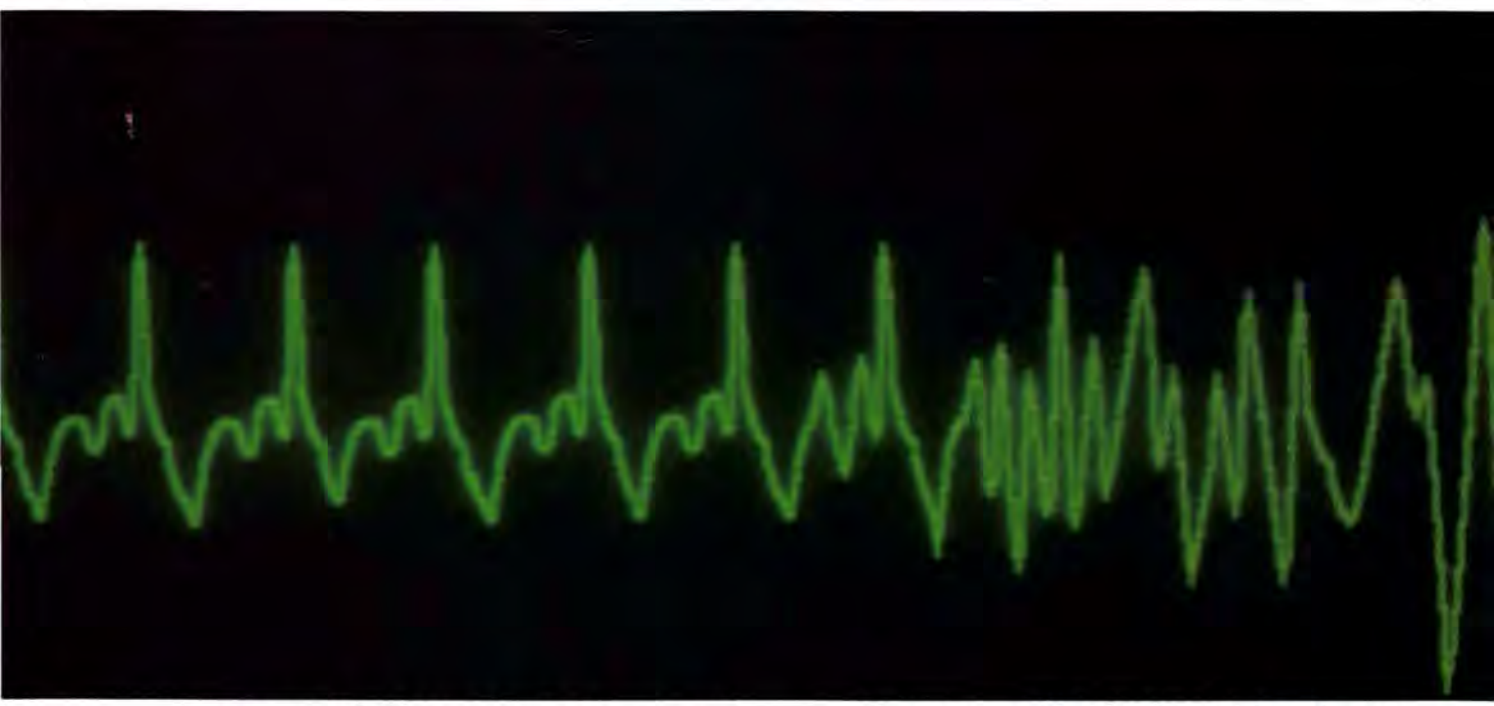
Incorporating copy-editing symbols from *The Chicago Manual of Style,* Annotator lets you edit any type of document by selecting symbols from the menu or entering them freehand, using a graphics tablet and pen.

Annotator also works with Farallon's Timbuktu and Timbuktu Remote to let remote users work on the same document simultaneously, so your committee of critics doesn't even have to be in the same building. Pricing for Annotator hadn't been set at press time. If you're ready to turn in your red pencil, contact Farallon Computing at 2150 Kittredge St., Berkeley, CA 94204; (415) 849-2331.

— Kristi Coale



Farallon's Annotator lets you mark up an electronic file as you would hard copy, using copy-editing symbols from *The Chicago Manual of Style.* Different comments can be distinguished by color or layer, creating an overlay effect. You can also record spoken comments with MacRecorder and save sound files with documents.



INTRODUCING SYMANTEC ANTIVIRUS FOR MACINTOSH (SAM).

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The Engineer's Software Toolbox

Engineering software is usually complex to develop and use, which is why many users who need a program for a specific purpose have problems finding one that does the job. That's the niche that MicroConcepts' Vector, an object-oriented engineering-applications generator, seeks to fill.

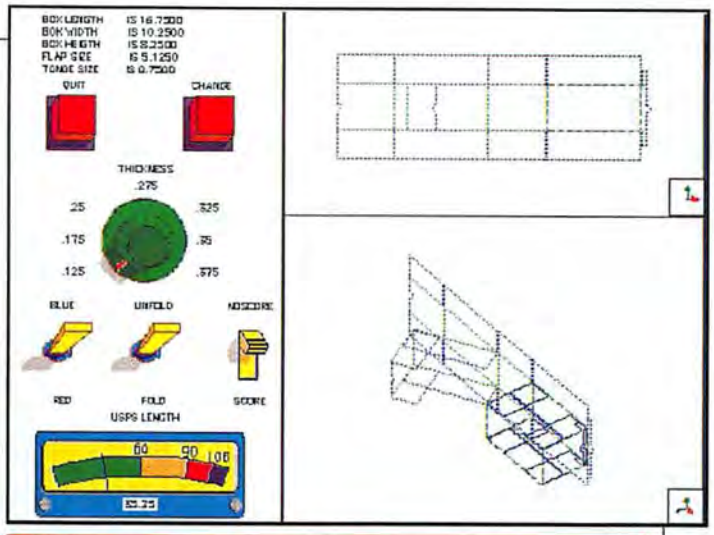
Vector is for developers who have specific needs but don't want — or don't have the time — to learn complete programming languages such as FORTRAN or C. Vector provides an open-architecture geometric database and many tools that developers can use to create applications quickly.

Since Vector is licensable, applications created with it can be distributed and sold. And to help get you started, the package comes with seven sample applications and the complete code for a 3-D CAD system. In addition to primitives and macros, Vector offers an array of interface and editing tools, full floating-point support, a math library, and C library access.

You can even use Vector to create a pseudo-HyperCard environment by linking different parts of the program's database with buttons. For example, clicking on the external view of a carburetor could bring up an exploded view that shows how to put one together.

Vector lists for $2,595 and is available from MicroConcepts, 4030 Piper Drive, Fort Wayne, IN 46809; (219) 478-8088.

— Russell Ito



Vector is an object-oriented software toolbox for creating engineering applications rapidly. This application for folding and scoring cardboard boxes was completed in just 15 hours.

PageMaker Turns Japanese

Aldus now offers the Kanji version of PageMaker 2.0 to the U.S. through Qualitas Trading, which distributes the package and offers technical support in Japanese.

Kanji PageMaker accepts the same word-processor and graphic files that PageMaker 2.0 accepts, in addition to files created in EG Word, a Japanese word processor. It is also compatible with the Apple System Script Manager, which makes spacing allowances for the larger Kanji and Katakana characters when performing such operations as text wraps. Those who can get a LaserWriter NTX-J, the Kanji PostScript printer from Apple Japan, will find that Kanji PageMaker works with it too. Contact Qualitas Trading, 6907 Norfolk Road, Berkeley, CA 94705; (415) 848-8080.

— Kristi Coale



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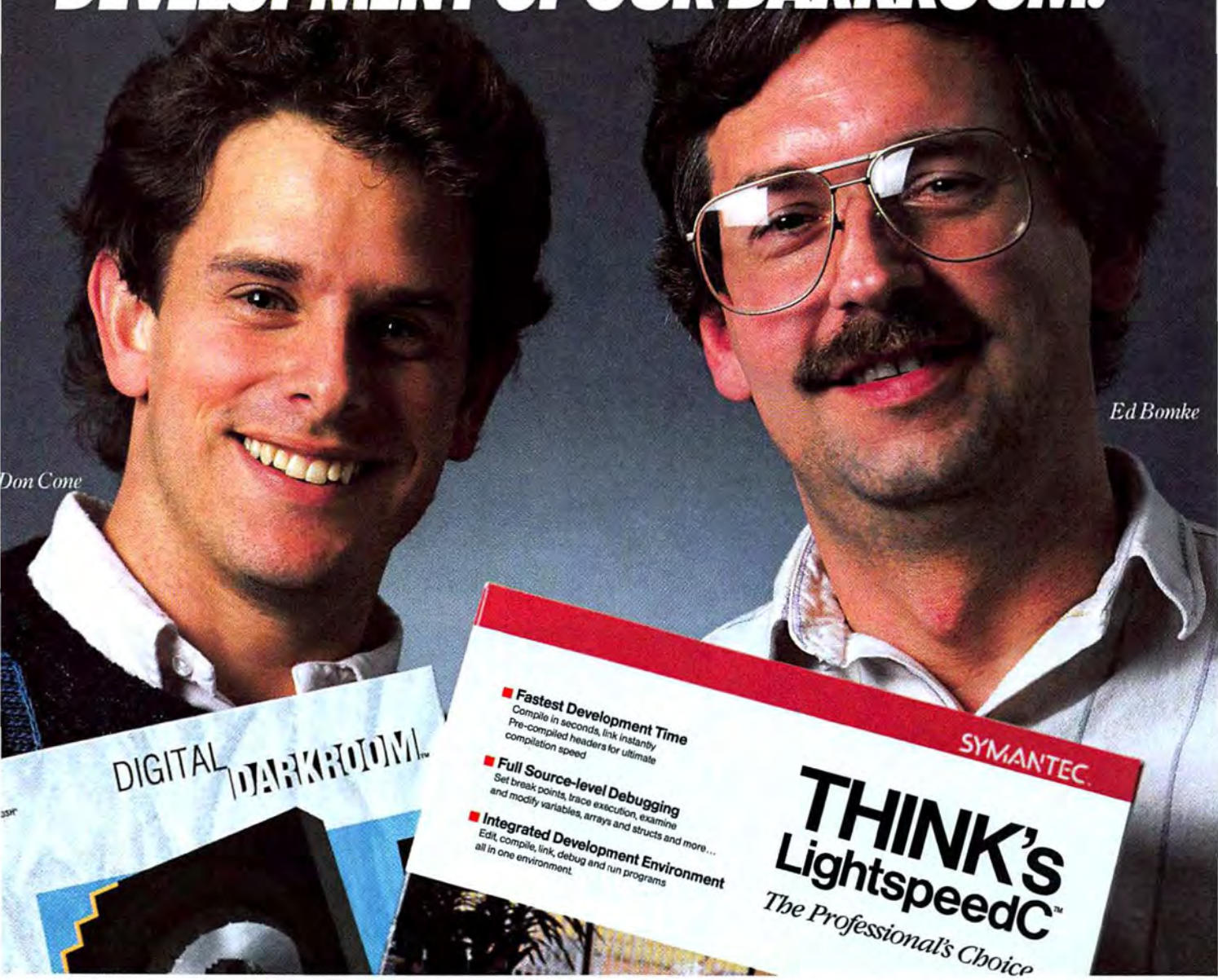
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QUICK CLICKS

This month, we review DAtabase, a flat-file manager in a DA; DynaPerspective, a Japanese-import 3-D architectural modeling package; SuperPaint 2.0, SuperPaint's first upgrade; FileMagic, a utility that tries to improve the Standard File Dialog; Vantage, a text editor and commercial version of McSink; and Redux, maybe the best backup program around.

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EDITED BY RUSSELL ITO

DATABASES

DAtabase

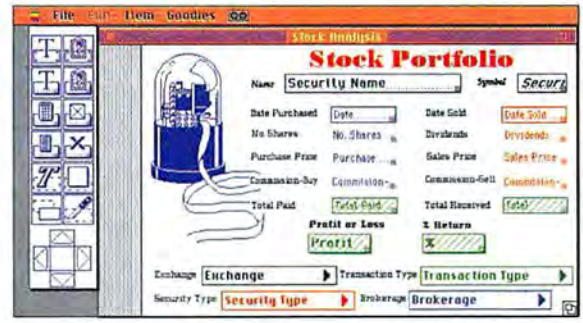
The first thing you'll think when you use DAtabase is why didn't anyone do this before? A flat-file manager that is always available on the Apple menu is just too good an idea to have taken so long to appear. Why no one thought of it before is a mystery, but it's here now, and it's a winner.

DAtabase is a collection of programs. The centerpiece is, of course, the DA itself, which lets you browse, search, and update databases at any time. DAtabase Builder is the application that you use to design and lay out databases, define and name fields, and so forth. DAtabase Converter, another application, helps you move existing data into new databases. Converter can process text files (you can define the delimiters), so you can import data from other database programs. It also handles pictures as Scrapbook or PictureBase files and can be used to merge DAtabase files or import QuickDex files. DAtabase Utility is a HyperCard stack that exports data from HyperCard into a text format that DAtabase Converter can handle.

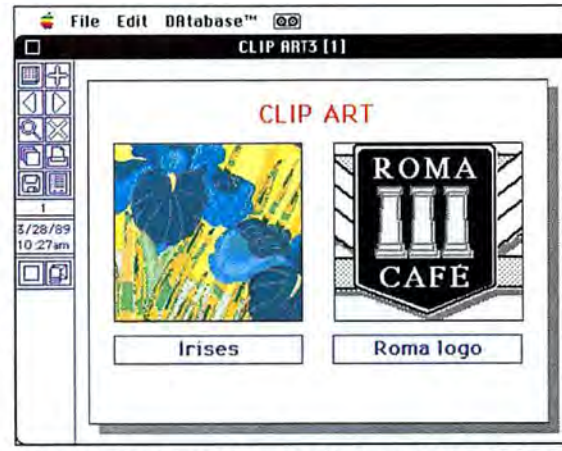
DAtabase databases don't have to be simplistic or small. DAtabase supports color graphics as backgrounds and fields. Besides graphic and text fields, DAtabase supports check-box (on or off), pop-up-list, and calculated fields. A DAtabase file can contain 2,500 records with 50 items (fields and/or labels) per record.

If you need another feature, DAtabase lets you add it through the Xtra feature mechanism. Xtra features are special programs, such as a phone dialer, a paint or text grabber, or a calendar (these and many others are supplied), that can be added to a DAtabase file. Programmers can write their own Xtra features. DAtabase also comes with an application, FKEY to Xtra, which translates function keys into Xtra features.

Using DAtabase is easy. Start by using DAtabase Builder to design a database. DAtabase comes with example databases that you can examine for ideas, and if you want to copy a layout, just do a Save As; DAtabase Builder will reproduce the



DAtabase is an excellent flat-file-manager DA. DAtabase files can contain up to 2,500 records. The package includes the DA, a number of utilities, and the DAtabase Builder. The Builder application (shown here) is where you design databases, such as this stock-portfolio manager. The tool palette's available field types are (from top left): text labels, background graphics, text, graphics, calculated, check box, pop-up list, and Xtra feature. The remaining tools are for font and styles, borders, duplication, deletion, and nudging.



DAtabase not only uses pictures as backgrounds but also is an excellent medium for storing pictures — including color images. DAtabase comes with a utility for converting Scrapbook and PictureBase files (as well as text files and QuickDex files).

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QUICK CLICKS

DAtabase may be just the file manager you've been looking for — and in a desk accessory to boot.

layout but not the data. Builder has a tool palette that helps you do your layout work, or you can use Command keys or the menu items, which correspond to the tools. As you lay out the fields, you can specify the font, size, style, color, and justification of each field. Each field can have a specified border, background pattern, and color. When you've finished the layout, you can control the tabbing order of the fields. Once the database is built, you can enter data or import it, using DAtabase Converter.

Now you're ready to use the DAtabase DA. When you open DAtabase, you see the DAtabase MiniFinder. This window operates much like HyperCard's Home card; you can install up to five pages of nine DAtabase file icons each, and DAtabase will remember where the files are. You can also set one file as your auto-open file; whenever you open DAtabase, that file automatically opens.



DAtabase ★★★★½

List Price: $129.95
Published by: Preferred Publishers, 5100 Poplar Ave., Suite 706, Memphis, TN 38137; (800) 446-6393; (901) 683-3383.
Version: 1.12
Requires: System 4.1 or later.
Compatibility: Mac 512KE or later.
Application Size: DAtabase Builder, 105K; DAtabase Converter, 101K; DAtabase DA, 138K.
Copy Protection: None

When you select a DAtabase file, you open the DAtabase program. Like DAtabase Builder, DAtabase has a tool palette that duplicates many of the items from the DAtabase menu. By clicking on the tool icons, you can open a view-by-list window, add a record to the end of the file, delete a record, search the database, sort the file, print selected records, go to a specific record, or mark and unmark records.

DAtabase has many features you don't expect to find in a DA. It sorts on up to three fields, in ascending or descending order. The searching capability lets you search on a single field or on all fields, using standard comparisons. Marking records is another powerful feature. Searches can mark records, or you can mark and unmark records manually. Once a number of records have been marked, they can be searched, printed, or exported separately.

DAtabase can print records either as a list or as "cards" (records as they appear on-screen). DAtabase determines the page size (allowing for any enlargement or reduction) and calculates how many records will fit on a page. When printing a list, DAtabase prompts you for the fields you want to print if they will not fit on a page.

DAtabase's sole weakness is its documentation. The manual spends so much space in a good but superfluous introduction on how to use a Macintosh and a mouse that it omits important information, such as the fact that you need to move the Help file into your System folder if you want to avoid hanging your machine when you invoke Help. The tutorial HyperCard stack is no help at all, since it presumes you can read only two words a minute and forces you to wait so long to get any information that you're better off just experimenting on your own.

DAtabase is an outstanding program and a good value. It compares well with stand-alone file managers such as Microsoft File and FileMaker II. If you've been looking for a file manager, a good phone book, a clip-art inventory, and a weekly calendar, take a look at DAtabase. It may be exactly what you've been looking for — and in a DA to boot.

— Robert R. Wiggins

GRAPHICS

DynaPerspective

As architects or interior designers can tell you, 3-D perspective drawings are time-consuming to do by hand but are invaluable aids for presenting designs to clients and colleagues. DynaWare has ported a Japanese 3-D architectural modeling program from the PC to the Mac that integrates perspective drawing and structural modeling into one package. For a first release, DynaPerspective is a solid high-end tool, but it needs some fine-tuning to make it an industry leader.

DynaPerspective's most powerful aspect is that it creates perspective drawings and elevations automatically from a floor plan. A document consists of four linked views: a floor plan (top view), two elevations (front and side), and a perspective view. These views can be tiled and displayed together or individually. Work can be done in any view, but the floor plan is where you'll do the most work.

The perspective view and light source can be easily set from any angle or distance, with a variety of tools. The easiest way is by drawing a 3-D vector (changeable in all views) indicating direction and distance. You can also set the view by typing in coordinates or using one of four on-screen view-manipulation tools (distance, rotate, angle, and eye rotate), whose names are conveniently displayed when you click the icons.

All the work is done in the wire-frame mode, because the solid (or rendered) mode is reserved for viewing and changing colors. Specialized drawing tools let you create straight and curved walls, stairways, roofs, posts, and various 3-D shapes. The stairway tool is particularly handy; you set the dimensions and click on two points. You create walls in the top view, using the wall tool and typing in the endpoint x-, y-, and z-coordinates, height, and thickness. Objects can be made transparent so that your designs can include see-through windows or water.

Designers can try out several color schemes on a rendered image in minutes. Click on a color with the eyedropper tool and change the hue, saturation, and brightness (HSB) by scrolling, clicking, or typing. The color palette can be changed by manipulation of the standard color wheel, using HSB or RGB (red, green, blue) color schemes. Gray scale is also supported.

DynaPerspective can also produce animations called *simulations* that can "fly" you around buildings and in and out of rooms. When you set two perspective views — say from opposite sides of a building — the Simulation function creates (or *tweens*) up to 30 frames that move across the two views. A simulation, which can be edited, can contain 8,970 frames. You can set the frames to advance at your mouse click, slide-show style.

DynaPerspective could be much easier to learn and use, however. For one thing, it could use live coordinates to show where the cursor is. Most designers don't know the x- and y-coordinates of every element on a blueprint but do know the lengths of walls and relative distances of objects. Right now you get coordinates only *after* you click the mouse to define the wall endpoint.

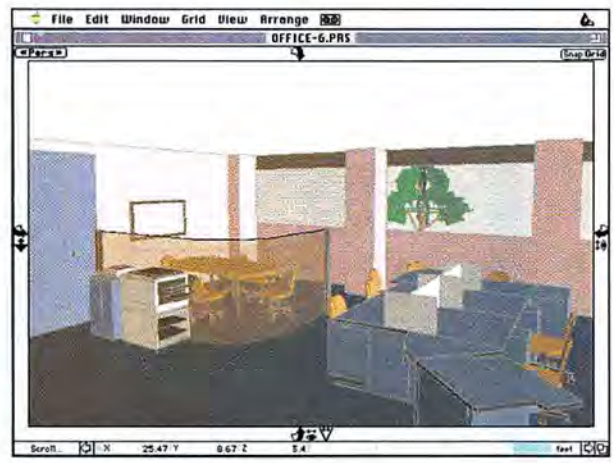
The program could use a feature that would allow you to punch holes in walls to insert windows and doorways. In the current version, you have to build the walls above, below, and around a window. Two other conspicuously absent features are the abilities to open more than one document at a time and to scroll views. A nice extra would be shadows. (DynaPerspective currently supports only shading.)

The only bug I found was that DynaPerspective sometimes quits in MultiFinder when you are switching between applications.

I also ran into a case of "It's not a bug; it's a feature." The floor plan and elevation views are always linked, even when you display only one view, so zooming in on one zooms in on them all. A zoom that cuts off part of a drawing in one view gives you a cross section in another. This



DynaPerspective has four linked views. The south elevation view shown here (lower left) is a cross section: the southern wall is missing from the elevation because it lies beyond the top view window (upper left). The pen color is chosen from the alterable palette at bottom, and the colors of existing objects can be changed with the Color Controller at bottom right.

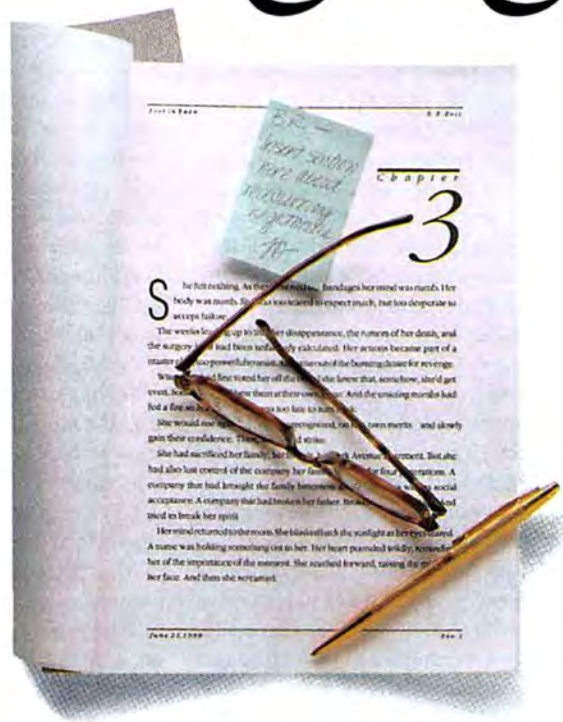


This perspective view in DynaPerspective demonstrates the program's ability to create transparent objects, such as the glass room divider and the window looking out on a tree. The chairs, desks, and copy machine can be stored as library parts for use in other designs.

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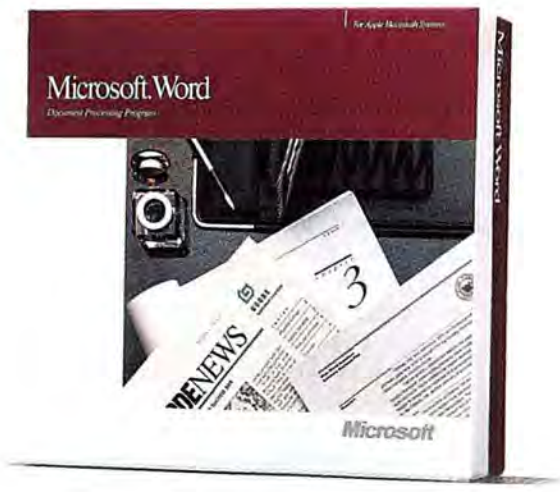


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SILICON BEACH SOFTWARE

And keep in mind Microsoft Word is part of an entire line of Microsoft products that work seamlessly together, so you can do more with your Macintosh.

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limits how close you can zoom, particularly on long objects. You should be able to turn this feature off.

The manual reminds me of the toy instructions that threaten "some assembly required." For instance, the tutorial uses hard-to-remember keyboard commands. Later on, it casually mentions the mouse. The manual also contains some confusing errors, such as misnamed menu commands. At press time, DynaWare said it was rewriting the manual.

Documents can be printed on LaserWriters, color laser printers, and plotters (using MacPlot). Printing a rendered object on a laser printer can take several hours, so it's best to print wire frames. For electronic output, you can save in normal and PICT (2-D) format. DynaWare plans to support AutoCAD's DXF format by April.

DynaPerspective is good at accurately rendering hidden surfaces. In fact, DynaWare optimized its algorithms for speed, but it's a good idea to have as much RAM as possible. I recommend a 68030-based Mac over a Mac II for *any* 3-D CAD program. Better still is an accelerator card with a processor faster than Apple's 16-megahertz clock speed; 3-D modeling is a workstation task, and personal-computer hardware can use the help.

Realizing this, DynaWare made automatic screen redraw an optional command, saving you the agony of waiting for the screen to redraw every time you change the image. In addition, clicking the mouse anywhere on screen stops the redraw caused by changing views.

DynaPerspective is a potentially top-notch architectural modeling program that could use some maturing. Even so, design groups will benefit from the added ease and versatility in the development and presentation of their designs.

— John Rizzo



DynaPerspective

★★★★

List Price: $1,495
Published by: DynaWare, 1163 Chess Drive, Suite J, Foster City, CA 94404; (800) 444-3962.
Version: 1.0
Requires: System 5.0 or later; 2 megabytes, 4 megabytes with MultiFinder; 8-bit color-video card.
Compatibility: Mac II, IIx, IIcx, SE/30.
Application Size: 380K
Copy Protection: None

GRAPHICS

SuperPaint 2.0

SuperPaint 2.0 is the first major upgrade of the original combination paint (bit-mapped) and draw (object-oriented) program. SuperPaint was originally more paint than draw, but SuperPaint 2.0 tips the scale in the opposite direction. The result is a product that lies somewhere between MacPaint 2.0 and Canvas 2.0. The paint layer has been improved with the addition of new tools, such as a multigon tool (also available in the draw layer), and three new selection tools (oval, polygon, and freehand). But the greatest improvement is the addition of SuperPaint's most innovative feature: plug-in tools.

Plug-ins are independent routines (kept in a folder with the Preferences file) that are automatically incorporated into SuperPaint as tools or menu selections. The program comes with an assortment of 38 plug-ins, ranging from cute "rubber stamps" to sophisticated tools such as a 3-D rectangular solid, a customizable airbrush, a drop-shadow box, and a calligraphic pen. Many plug-ins can also be customized. Plug-ins let users customize the program by picking the third-party plug-ins they want.

The draw layer, which in its earlier incarnation was fairly basic, has had a major face-lift. Among the additions are Bezier curves and Replicate and Autotrace commands. The Bezier tool transforms freehand doodles into controllable, smooth curves. This is one of the most intuitive implementations of Beziers I have seen. You can lay out curves quickly and shape them to fit by clicking on a control point and manipulating the handles. New control points can be added anywhere, and they can be smooth or hinged (pro-

ducing a sharp bend). But the Bezier tool isn't perfect. The control points and handles disappear from the screen as you manipulate them—their visibility would preserve a frame of reference.

Replication differs from duplication in that it allows you to specify attributes (scaling, rotation, or movement) for the reproductions, but SuperPaint's implementation is flawed. Since attributes are calculated from definitions based on the *attitude* of the original object (the upper right or lower left, for example), the position and attitude of each new object is always relative to the last copy. As an object rotates, the point defined as its upper right changes, so some useful replications (such as laying out a circle of rectangles) can't be done in one operation. The ability to replicate from an absolute reference would be a major improvement.

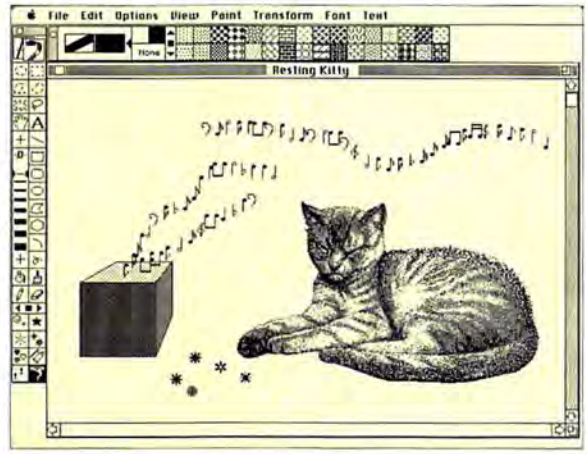
The Autotrace command offers another way of transferring bit maps directly to the draw layer. Autotrace detects a bit map's edges and creates an outline object. You can define the smallest aggregate of pixels that should be traced, whether the trace should be biased toward curves or straight lines, and whether the outline should be created as a polygon or as a set of Bezier curves. Autotrace works quite well. Depending on the image, you may have to play with the settings to get precisely what you want, but even complicated bit maps are traced quickly and accurately.

One of the best features of SuperPaint was LaserBits, which permitted image editing at the 300-dot-per-inch (dpi) resolution of the LaserWriter. LaserBits have been replaced by SuperBits. The principle remains the same, but gone are the image-size and resolution restrictions of version 1.0. SuperBits images can now be as large or as detailed (at resolutions beyond 300 dpi) as memory allows. SuperBits reside in the draw layer but can be edited with the full complement of paint tools. Working with large images at ultrahigh resolutions eats up memory quickly. When SuperBits images are too large for your Mac, however, SuperPaint 2.0 lets you edit them in sections.

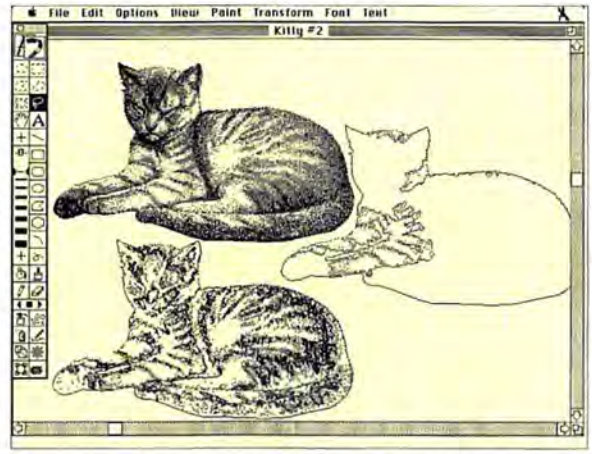
SuperPaint 2.0 is not a color program, but it supports the eight original QuickDraw hues. Colors can be assigned to each object (foreground and background, line, and fill) in the draw layer and globally to the paint layer. However, to see color assignments on-screen (on Mac IIs), you must change to the Color Preview mode, where no editing is possible. Modal operation is a Mac interface no-no, although other color programs do the same thing.

SuperPaint 2.0 can apply transformations to text and graphics in both layers. In the draw layer, objects can be scaled, rotated, slanted, flipped, and stretched. Two additional effects (distortions and perspectives) can be applied to bit maps in the paint layer. Colors or patterns assigned to text in the draw layer don't survive a transformation—the objects appear black in color preview and print as such. The assignments will be restored, however, if you remove the transformation.

Line arrows and dashed lines are available in both layers and can be customized through dialog boxes. In the draw layer, a hairline option appears on the palette. Hairlines are represented on-screen as 1-point lines but print at their true dimensions on PostScript printers. Only one hairline size (0.25 points) is possible; there are no intermediate sizes. SuperPaint respects the integrity of hairlines created



SuperPaint's plug-in tools, the program's most innovative feature, appear at the bottom of the paint-layer tool palette in alphabetical order. The music box, notes, and cat toys are all plug-ins. The Twister was used to ruffle Kitty's fur.



SuperPaint 2.0's Autotrace can change even complex bit maps into object outlines. The original Kitty is flanked by two auto-tracings. Settings were for 1-pixel polygons. At right, only the outline was specified; at bottom, the entire image was traced.



SuperPaint 2.0

$$$$

List Price: $199
Published by: Silicon Beach Software, 9770 Carroll Center Road, Suite J, San Diego, CA 92126; (619) 695-6956.
Version: 2.0
Requires: System 6.0 or later.
Compatibility: Mac 512KE or later with 1 megabyte.
Application Size: 505K
Copy Protection: None

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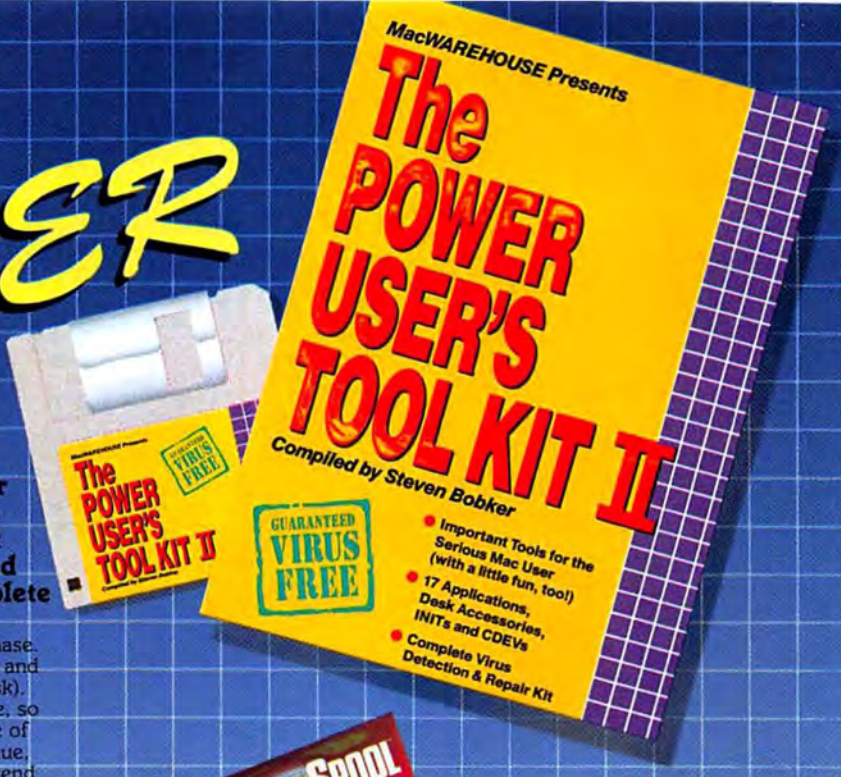
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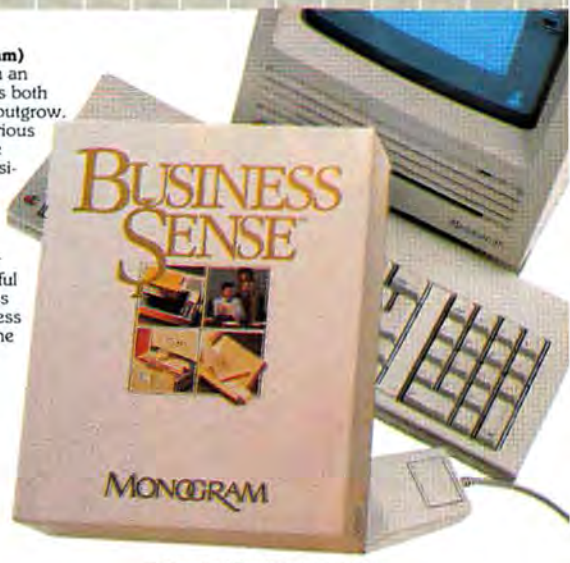
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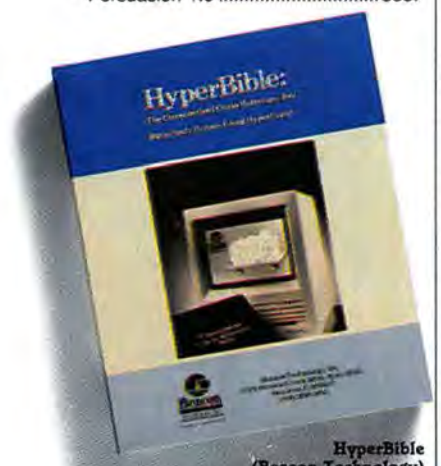
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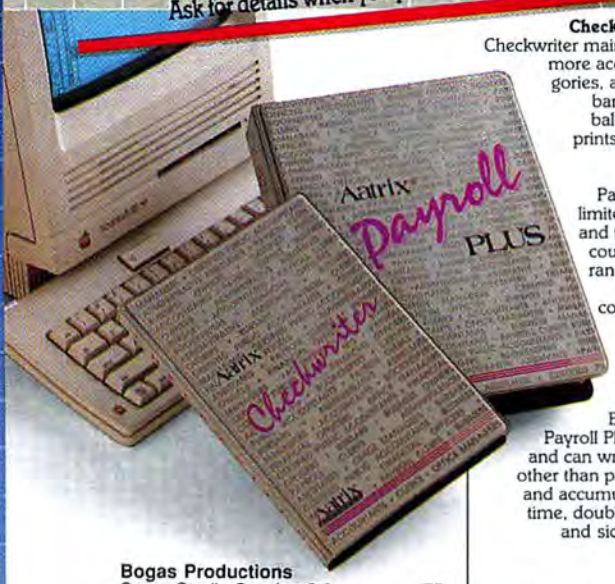


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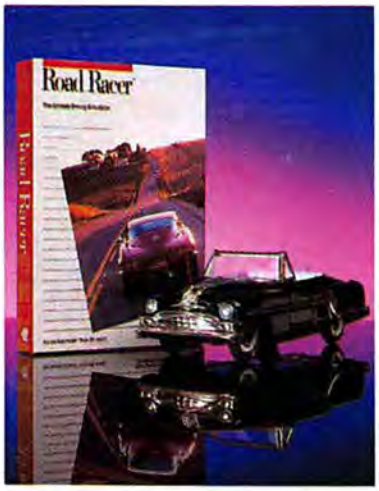
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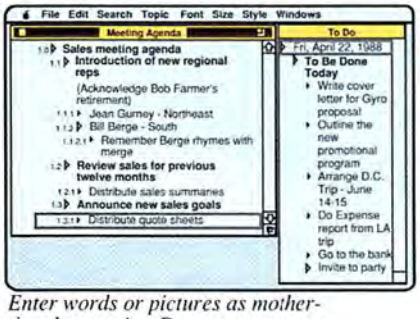
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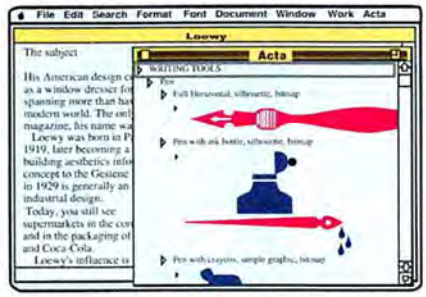


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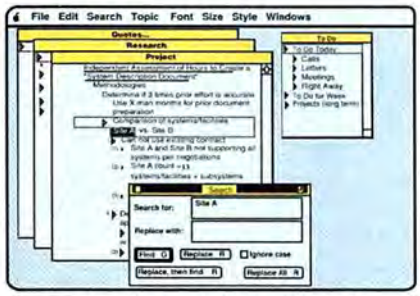
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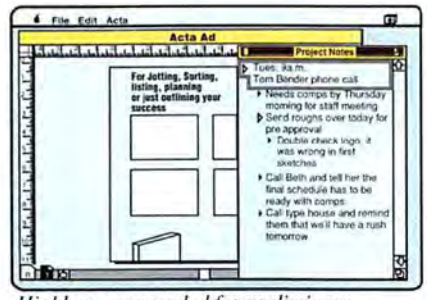
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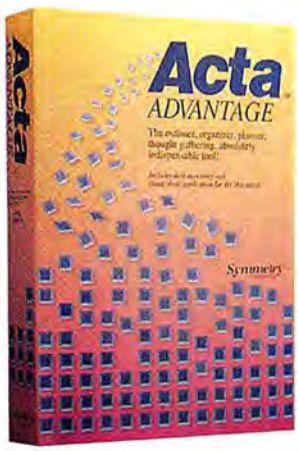
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in other programs, however; files containing other sizes can be moved in and out without damage.

The zoom window has been improved with a larger, fully editable, normal-view section. But at full magnification, draw-layer objects appear as pixels, not as objects. Editing them is counterintuitive, if not impossible — no other program behaves this way. The magnification process has been simplified with the substitution of Command-key equivalents for version 1.0's magnifying glass. Simply place the cursor (or any tool) over the desired area, press two keys, and presto — no trips to the tool palette required.

SuperPaint 2.0 runs well and is stable, but it's no speed burner.

SuperPaint 2.0's new native format is PICT2, which is a great improvement over the old proprietary files. In addition, the program can read PICT, MacPaint, SuperPaint 1.0, and startup-screen files. It can also save documents in MacPaint format or as startup screens. The Place command can import a black-and-white TIFF file directly to SuperBits. With the Export command, Beziers can be saved as Illustrator 88 files, and bit maps can be saved in TIFF.

The manual is only adequate. Its organization can be confusing, and the explanations of complex subjects such as SuperBits and Autotrace lack depth. Also, some late alterations to the program are not reflected in the documentation — even in the pack of addendum pages — so some items that the manual locates in a dialog box actually appear on a menu.

SuperPaint 2.0 runs well and is stable, but it's no speed burner. Put some complex objects in the draw layer and, even on a Mac II, you'll wait. SuperPaint 2.0 is a competent monochrome painting and drawing environment, but it isn't king of the hill.

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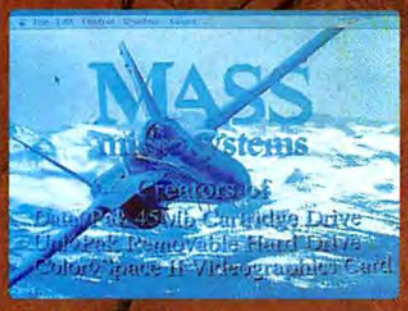


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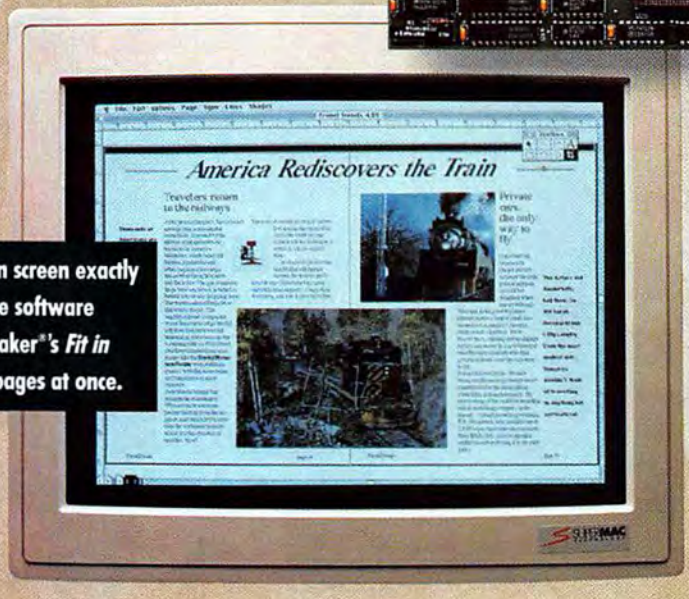
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UTILITIES

FileMagic

For some time, developers have been adding functionality to the Standard File Dialog box (SF Dialog for short), which you see when you choose the Open or Save As commands. Since Apple's design doesn't include such useful functions as finding lost files or creating new folders, third-party developers have stepped in with packages such as QuickFolder, SFVol, Findswell, On Cue, DiskTools, and DiskTop. Magnus Software has tried to combine these efforts in FileMagic, but so far it hasn't had much success.

FileMagic is a good idea, but it needs a little more work.

The centerpiece of the SF Dialog is a window where you select files, so Magnus has added a menu with a host of file-management functions. Clicking on the box containing the folder or disk name above the scrolling window normally shows you a menu of all the folders you've opened to get where you are. Installing the FileMagic INIT replaces this display with its own menu.

The Files item lets you install frequently used files into a pop-out list, so you can access them immediately. When you choose a file, it opens on top of others that are already open if the application permits multiple windows. The Folders item does the same thing for folders. But if the application doesn't permit you to open multiple files (any version of MacWrite prior to MacWrite II, for example), you won't have access to the Open command, so you won't be able to use FileMagic's capabilities. Only files that are compatible with the current application are displayed; FileMagic can't transfer to other applications.

The Preferences item lets you set the way some features work. You can choose either to display the folders that FileMagic has installed within the current application, or all installed folders. The FileMagic menu can appear when you click on the folder name box or when you simultaneously hold the Option key and click. I often found myself disoriented using FileMagic — getting its menu instead of the folder menu — until I changed this preference.



FileMagic converts the familiar box above the scrolling file window in the Open or Save dialog boxes in any application into its own menu. FileMagic gives you convenient access to your most commonly used files and folders (listed in the pop-out menu). It's a good idea, but this version is unstable and needs more work.

Magnus uses a modular approach to adding functions. Each comes as a small file to copy into your System folder and adds a new menu item. Included with the package are Copy, Delete, Find File, Get Info, and New Folder. Magnus is working on new functions and invites other developers to do likewise.

Copy lets you duplicate or move a file. Find File looks just like Apple's version but lets you limit the search to files compatible with the current application and ignore folders. The Get Info box is the Finder's, but you can also use it to change the type and creator codes of a file.

FileMagic is a very good idea, but it's not ready. Although implementing each function with a separate file lets you select only the functions you need, it clogs up already-jammed System folders. I'd prefer to access the FileMagic menu through a separate button or by clicking on the disk name, as in QuickFolder or SFVol. Unlike DiskTools or DiskTop, the SF Dialog does not permit multiple-file selection by Shift-clicking, so you can work on only one file at a time. It's dangerous to make it so easy to change type and creator codes.

I also had compatibility problems with FileMagic. I normally run a System folder packed with INITs. The Copy command in FileMagic froze my Mac every time until I deactivated SFScrollInit. Magnus says this is being fixed. But even without that INIT, I experienced system errors. There were fewer bombs when I turned off all my INITs, but that's not an acceptable choice.

FileMagic ships with two utilities: WindowMagic and MultiMagic. Under WindowMagic, Option-selecting the Apple menu brings up a menu of open windows. With MultiMagic you can configure multiple startup application sets for MultiFinder and select which you want during boot-up.

FileMagic's basic function of permitting immediate access to often-used files is worthwhile, but I'm not satisfied with its interface or stability. FileMagic is a good idea that needs more work.

— Darryl Lewis

FileMagic

List Price: $99
Published by: Magnus Corp., 800 Koll Center Bellevue, 500 108th Ave. N.E., Bellevue, WA 98004-5560; (800) 462-468 or (206) 646-7374.
Version: 1.0
Requires: System 6.0.2 or later.
Compatibility: Mac 512KE or later.
Application Size: 52.5K for FileMagic with the included function files; MultiMagic, 10K; WindowMagic, 5K.
Copy Protection: None

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Auto-formats without time lapse	YES	NO	NO	NO
Restores backups from PC	YES	NO	NO	NO
Built-in macro	YES	NO	NO	NO
Scheduled macros	YES	NO	NO	NO
Multiple setup files	YES	NO	#	NO
Prints labels (ImageWriter & LaserWriter)	YES	NO	NO	NO
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* Most require a separate driver.
Allowed to save preferences, not multiple setup files.

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WORD PROCESSING

Vantage

Dave McWherter has successfully labored to evolve McSink, his shareware DA Clipboard editor, into a powerful text editor. While continuing to support McSink as shareware, Dave built in some new features and is marketing the result commercially through Preferred Publishers as Vantage.

Vantage serves two purposes. Besides editing text, it adds its Clipboard-editing power to any application. Opening Vantage from the DA menu opens a window into which current Clipboard text is automatically copied. This is Vantage's scrap window. Anything in the scrap window is automatically copied back to the Clipboard when you close Vantage, so you can paste it back into your application.

Vantage is the ideal place to convert text files between DOS and Macintosh formats.

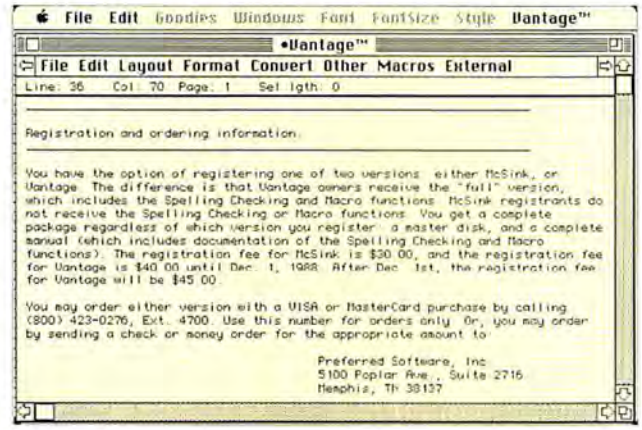
Sixteen windows can be open simultaneously, including the scrap window. Each can contain unlimited text, and the limit for all open windows is your Mac's available memory. Vantage comes equipped to read Microsoft Word 3.01, WriteNow 1.0 (version 1.1 of Vantage will open WriteNow 2.0 files), and MacWrite 4.5 and 5.0 files, in addition to files saved in text format.

Editing text proceeds as with any Macintosh word processor, with one exception. In Vantage, if you don't select some specific text, the menu commands will apply to the whole document — and a host of menu commands are available. The following examples are just some of them.

Vantage can change selected text to uppercase or lowercase, as well as capitalize each word or sentence. It can also tell you how many lines, words, characters, sentences, and paragraphs are in a document or selection.

Vantage finds and replaces strings of characters, including tabs, returns, line feeds, form feeds, other control characters, wildcard characters, and multiple repeats of the same character. It can add powerful find-and-replace routines to applications that do not support them, such as PageMaker. Invisible characters such as returns, tabs, and spaces can be made visible. Runs of a specified number of spaces can be converted to tabs, or vice versa. Line feeds can be added or stripped. While all Vantage files are saved as text, you can assign any creator code you choose. These features make Vantage the ideal place to convert text files from one application's format to another or to convert between DOS and Mac formats. I used it to convert my Microsoft Works Rolodex database into QuickDex format. Vantage also comes with Vantage Opener, which gives your Vantage documents a recognizable icon and enables you to open them by double-clicking.

Vantage wraps text to any number of characters per line or to the width of your current window. This is a text editor, however, not a word processor. There is no ruler with margins, and copy does not automatically rewrap when edited; you must choose the Wrap command. Although there are menu items for Font, Size, and Style, you cannot mix different sizes or styles within a document.



Vantage is the commercial version of McSink, a popular text-editor DA. Launching the DA opens the Vantage scrap window, which automatically copies in the contents of the current Clipboard for editing and manipulation. Each window has its own built-in menu bar that can be displayed in icon form.



Vantage's Spelling Checker window appears blank when selected. Click on the Next button to go to the first misspelled word. Then click on the Guess button to see the guesses. Click on a guessed word or type your own correction and then click on one of the two Replace buttons to correct a single word. This click-happy spelling-checker interface is one of Vantage's biggest weaknesses.

Three features separate Vantage from its shareware cousin. Its spelling checker includes an 80,000-word dictionary to which you can make additions. Misspellings are shown in context, and it can guess the correct word typographically or phonetically. But this spelling checker is not automatic. After selecting the Spelling Checker menu item, getting to the first misspelled word requires that you click on a button. Guessing for each misspelling should be automatic, but it requires another button click. And click-

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ing on one of the guessed words should make the correction but requires a click on yet another button.

Vantage lets you write macro files that you can load and execute from within, and it includes samples that swap adjacent characters or words, wrap text within a paragraph, and type your name and address with one command. The Macros menu lists all open macro files.

If you're handy with Pascal, you can write external commands to give Vantage additional capabilities. The included Vantage Installer application installs them on the External menu. Samples include a disk cataloger, an icon grabber, and converters for "smart" (curly) and straight quotes. Externals can also serve as filters to let Vantage read other file formats. Vantage supports color, although version 1.0 has some minor problems with certain third-party monitors and upgrades. Preferred Publishers promises to fix that in version 1.1.

Vantage is excellent but not perfect. It should have dynamic word wrap and a better interface for its spelling checker.

Vantage is excellent, but it isn't perfect. It should have dynamic text wrap, and the spelling checker's interface needs work, but for converting file formats, adding replace and spell-checking capabilities to PageMaker, and reading and editing text files, Vantage has no equal.

— Darryl Lewis



Vantage

$$$$

List Price: $99.95
Published by: Preferred Publishers, 5100 Poplar Ave., Suite 617, Memphis, TN 38137; (800) 446-6393; (901) 683-3383.
Version: 1.0
Requires: System 4.2 or later. System 6.0.2 recommended.
Compatibility: Mac 512KE or later.
Application Size: Vantage DA, 103K; Opener Application, 4K; Externals Installer Application, 8K; Dictionaries, 103K.
Copy Protection: None

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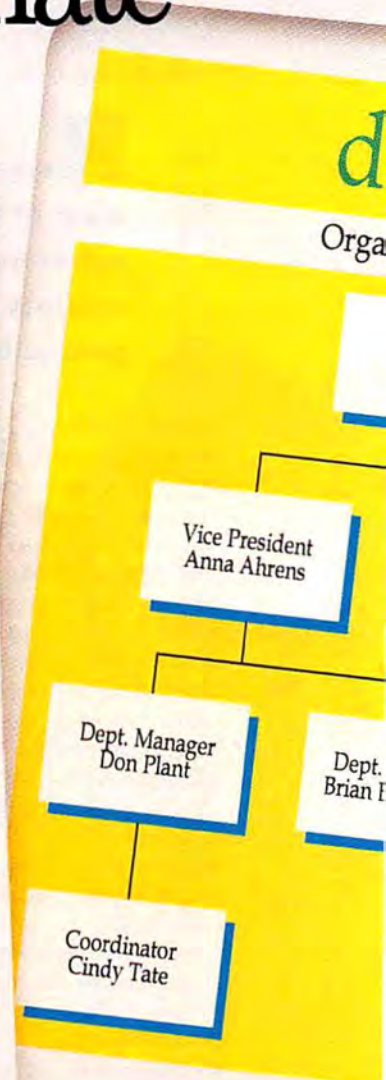


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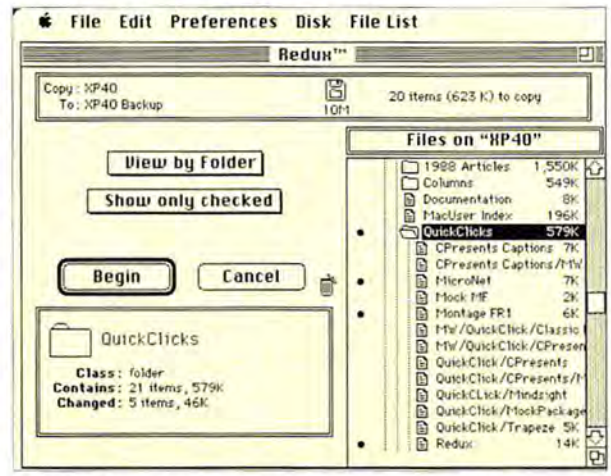
Redux

Hard disks have become standard equipment for most Macintosh owners, and if you use a hard disk, you should back up your work. Redux is an excellent aid in that process. It's an *incremental* backup program, so it copies only those files that have changed, speeding up most backup operations considerably.

Redux is easy to use. When you run the program, a window appears listing all the disks on-line. Select the disk you want to back up (the *source* disk). Redux then asks which disk(s) you want to back up to (the *target* disk). If the target disk can hold everything on the source disk, Redux gives you the option of performing a disk-to-disk copy or a backup using Redux's file format for improved speed. The latter results in backup disks that only Redux can read. Redux asks for additional target disks as it needs them until the backup is complete and then asks for the first disk again, where it records a directory of what was backed up. The next time you back up the same source disk to the same target disk(s), Redux compares the backup directory with the source disk's directory and backs up only the changed files. This process makes maintaining a current backup quick and painless, and the more often you back up, the less data you stand to lose in an emergency.

Redux takes most of the work out of backing up and lets you be productive.

That is all many people need in a backup program, but Redux can do much more. If you turn on the Power User setting in the Preferences menu, you can control which files get backed up, back up particular files or folders, and even add or delete files from the backup. Redux's File List window lets you print a catalog of the disk or save it as a text file. You can even rearrange files and folders (including throwing them away) directly from the Redux File List, and the changes you make affect the hard disk as well as the backup. From the Filter Controls window you can select or exclude files to be backed up, based on file type, age, or by parts of the filename (all files with names beginning with FP2, for example). If you want even more control, you can write scripts using the Redux control language, BackTalk.



Redux is a terrific backup program that's ideal for anyone backing up to any Finder-mountable drive. In standard mode, the backup is automatic. If you want more control, the Power User preference gives you access to the File List window, where you can rearrange files and folders, throw files and folders away, and completely control the backup.

Redux is flexible and easy to use to restore data. You can restore an entire disk, a specific file or folder, or a group of files and/or folders, and you can write restore scripts. You can restore to a different disk, even one already containing data. During the restore, if Redux encounters a file or folder from the backup set that already exists on the source disk, it will ask you if you want to replace the existing file. Redux comes with a separate application, Redux Restore, that can be distributed free of charge. This allows you to share Redux backup sets even if the recipients don't own Redux. Redux Restore is also much smaller than its parent, so it can be useful when you're creating a bootable Restore disk (just in case).

Redux does have a few shortcomings. It doesn't support tape drives, except the few that can appear in the Finder, but it works very well with removable-media hard disks such as the Syquest cartridge system. Redux shouldn't be used for backing up AppleShare servers across the network (use Network DiskFit for that specialized application). The backup sets are readable only by Redux, so be sure you always have a copy of Redux Restore.

Redux is powerful, flexible, and easy to use. If you have a color monitor, it even adds color accents to make the displays more readable. Redux takes most of the work out of backing up and lets you be more productive.

— Robert R. Wiggins

[*We have been running Redux 1.5 and have come across a rare but reproducible bug. We don't know what causes it, and neither does Microseeds. Redux occasionally freezes at some point during backup. Usually, there's a tip-off: Redux predicts that it'll need an unusually large number of disks to complete the backup (say over 1,000). We've talked to Microseeds, and it is trying to fix the problem. — Ed.*]

Redux ★★★★½

List Price: $99
Published by: Microseeds Publishing, 7030-B W. Hillsborough Ave., Tampa, FL 33634; (813) 882-8635.
Version: 1.5
Requires: System 4.1 or later.
Compatibility: All Macs with 1 megabyte.
Application Size: Redux, 254K; Redux Restore, 106K.
Copy Protection: None

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Number of open documents	Unlimited *	1	30	30
Mail merge	Yes	No	No	Yes
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On-screen auto-numbering footnotes	Yes	No	No	No
Automatic repagination	Yes	Yes	No	No
Graphics in same line as text	Yes	No	Yes	Yes
Multiple headers and footers	Yes	No	No	Yes
Extensive Undo	Yes	No	No	No
Variable line spacing (in points)	Yes	No	No	Yes
Selective font, size, style, and ruler changes	Yes	No	No	Yes
MacUser Magazine's Best New Word Processor	Yes	No	No	No
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Spell Check document	6.3 *sec*	2 *min* 34.0 *sec*	2 *min* 2.3 *sec*	1 *min* 48.0 *sec*
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Change font size of document	10.7 *sec*	50.2 *sec*	17.6 *sec*	16.2 *sec*
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* Number determined by Macintosh system constraints.



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Microsoft Microsoft Works 2.0	189.	*(Specify MacPlus, SE or Mac II)*	459.
Microsoft Excel 1.5	255.	Fastat	165.

Overnight $3



Simply Accounting by Bedford Software

Simply Accounting, for small to medium size businesses, is sophisticated enough to please CPA's but simple enough to allow accounting and computer neophytes the power of a full accounting program. Includes general ledger, accounts payable, accounts receivable, payroll (50 state and federal tax schedules built-in), inventory and jobcost. It received a 7.9 rating from Infoworld and four mice from MacUser. **$219.**

DESK ACCESSORY PROGRAMS

Affinity Microsystems		**Jam Software**	
Tempo II	89.	Smart Alarms w/Appt. Diary	65.
Affinifile	45.	Multi-User Appt. Diary w/Smart Alarms	119.
Casady & Greene, Inc		**Mainstay** Think'n Time	59.
QuickDex 1.4A	32.	**Solutions, International**	
CE Software DiskTop 3.0	27.	Super Glue	49.
Deneba Software		SmartScrap & The Clipper V2.0	46.
Comment 2.0	62.	**Symmetry** HyperDA *(Req. 512K)*	35.



MAC-101 Keyboard by DataDesk

Replace your Mac's keyboard with the ***MAC-101*** by DataDesk. The positive tactile, firm feel 101 includes a full numeric keypad, 15 function keys, 6 page control keys, and a T-style cursor pad. Includes 101-Keys desk accessory software, a powerful macro utility that allows you to exploit the full power of the function keys in almost any Mac application. Available in ADB and non-ADB versions. **$145.**

SPELLING & GRAMMAR CHECKERS

Aegis Development		**Microlytics, Inc.**	
Doug Clapp's Word Tools 2nd Edition	42.	Word Finder *(Synonym Finder)*	33.
Deneba Software Big Thesaurus	62.	Electronic Word Finder	79.
Spelling Coach 3.0 Professional	105.	**Sensible Software**	
Electronic Arts Thunder! II	52.	Sensible Grammar or BookEnds	53.
Lundeen & Associates		**Working Software**	
WorksPlus Spell	46.	Spellswell 2.0	45.



FileGuard by ASD Software

FileGuard is the automatic file protection program that provides a comprehensive solution to all your problems of security and confidentiality. This integrated software will enable the user to easily protect documents against unauthorized access. *FileGuard* can even control the insertion of diskettes to prevent the illegal copying of files or the introduction of a destructive computer virus. .. **$129.**

UTILITY SOFTWARE

ALSoft Master Juggler	64.	**MainStay** AntiToxin or ClickPaste	65.
MultiDisk	***Special*** 49.	**Microlytics, Inc.** GOfer	***Special*** 43.
Disk Express	49.	**Microseeds** INITPicker	29.
Font/DA Juggler Plus	42.	Redux	55.
A.S.D. FileGuard	***Special*** 129.	ScreenGems	45.
Berkeley System Design		**Olduvai Software** Icon-It!	45.
Stepping Out II	52.	MultiClip	55.
Beyond Inc. Menu Fonts 2	28.	Read-It! O.C.R. Personal	109.
Central Point Software		Read-It! O.C.R. 2.0	245.
Copy II Mac *(Includes MacTools)*	20.	**PCPC** HFS Back-Up 3.0	54.
PC Tools Deluxe Mac	42.	**SuperMac Software**	
CE Software		SuperSpool 5.0	53.
QuicKeys *(Macro Program)*	52.	SuperLaserSpool 2.0	79.
MockPackage Plus Utilities	27.	Diskfit 1.5	***Special*** 53.
Farallon Computing		Sentinel 2.0	89.
Screen Recorder	133.	**Symantec** MacSQZ!	52.
Fifth Generation Systems		Symantec Utilities for Mac *(S.U.M.)*	69.
Suitcase II	45.	Symantec AntiVirus for Mac *(S.A.M.)*	69.
FastBack	54.	**Williams & Macias**	
Power Station	32.	DiskFinder	***Special*** 27.
Pyro!	15.	myDiskLabeler w/Color	29.
HJC Virex	69.	myDiskLabeler	
Icom Simulations On Cue	35.	w/LaserWriter Option	***Special*** 34.
Insight Development		StickyBusiness	***Special*** 99.
MacPrint	***Special*** 79.	**XTree Company** XTree	55.



MiniCad+ by Graphsoft

MiniCad+: Do it all on a professional-level CAD and Analysis system with 2D, 3D, programming language and the only dynamically linked spreadsheet in a Macintosh CAD program. User-friendly too. **$519.**

DATABASE MANAGEMENT

Acius 4th Dimension	389.	**Generation Four**	
Activision		Multiuser Business	
Reports for Hypercard	69.	Administration Series *(each)*	***Special*** 115.
Focal Point & Business Class Bundle	49.	**Microsoft** Microsoft File 2.0	129.
Apple Computer		**Odesta** Double Helix II	339.
HyperCard	42.	DataDesk Professional	285.
Borland Reflex Plus	189.	GeoQuery	199.
Claris		**Preferred Publishers**	
FileMaker II	229.	DAtabase	***Special*** 75.
Fox Software FoxBase+	205.	**ProVUE** Panorama	***Special*** 205.
FoxBase+ Multi-User	315.	**Software Discoveries**	
FoxBase+ Runtime	155.	RecordHolderPlus	65.



Cutting Edge 800K Drive by Cutting Edge

The ***Cutting Edge 800K*** floppy disk drive takes advantage of the newest technology to offer high speed, low noise, high reliability in a compact, stylish case. The *Cutting Edge 800K* floppy drive is compatible with all new ROM Macs including the Mac SE and Mac II. The *Cutting Edge 800K* would make an attractive addition to many Macs. **$175.**

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Programs Plus



Rags to Riches '3-Packs' by Chang Labs

Rags to Riches '3-Packs' offers the user flexible reporting, batch totals for any time period, user definable accounting cycles and impressive speed. As a special bonus, if you choose a '3-Pack' before June 30, *Programs Plus* will send you an Aatrix Payroll program, absolutely FREE! **General 3-Pack** (G/L, A/R, A/P) **($289), Pro 3-Pack** (G/L, Pro. Bill., A/P) **($359), Retail 3-Pack** (G/L, Invent., A/P) **($359)**.

ACCOUNTING PACKAGES

Aatrix Software		**Layered** Insight One Write	125.
Aatrix TimeMinder	159.	At Once!	***Special*** 295.
Aatrix Payroll Plus	***Special*** 159.	Insight Expert INV or Time Billing	409.
Bedford Software		Insight Expert GL, AR, or AP	***Special*** 409.
Simply Accounting	***Special*** 219.	**MECA** Managing Your Money	127.
Chang Labs		**Monogram**	
Rags to Riches Gen. 3-Pak 3.1 *(GL/AR/AP)*	***Special*** 289.	Business Sense	279.
Rags to Riches GL, AR, or AP	119.	Dollars & $ense 4.0	***Special*** 81.
Check Mark MultiLedger	259.	**Peachtree**	
Payroll	189.	Back To Basics Professional *(GL/AR/AP/INV)*	159.
Cash Ledger	129.	**Satori Software**	
Dac Software		Components GL	369.
Dac-Easy Light	42.	**Survivor Software**	
Intuit Quicken	32.	MacMoney 3.0 *(Enhanced Ver.)*	61.



atOnce! by Layered Inc.

atOnce! is the next generation in high-speed small business accounting. Included in one seamlessly integrated module are four full featured applications: General Ledger, Accounts Receivable w/Billing, Accounts Payable & Payroll. **$295.**

COMMUNICATION SOFTWARE

Compuserve		**Insigna** SoftPC	249.
Compuserve Starter Kit	24.	**Software Ventures**	
Compuserve Navigator	45.	Microphone II v3.0	***Special*** 219.
DataViz		**Solutions, International**	
MacLink Plus/Translator	115.	BackFax	125.
MacLink Plus with Cable	139.	**Synergy Software** VersaTerm	64.
Freesoft		VersaTerm-Pro	185.
Red Ryder V10.3	54.	**Traveling Software**	
Hayes Smartcom II 3.1	88.	LAP-LINK	82.

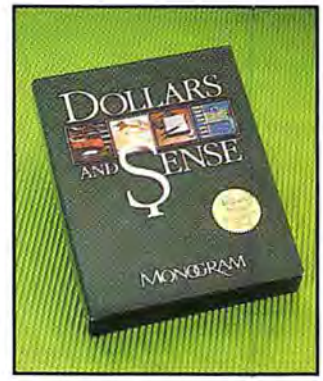
Panorama by ProVUE Development



Panorama combines the speed and simplicity of a spread sheet with powerful forms capabilities. *Panorama's* spread sheet structure is spectacularly fast and is easy to understand, and use. *Panorama* sorts, analyzes, categorizes, calculates and charts faster than the blink of an eye. *Panorama* is the database that thinks its a spread sheet! **$205.**

GRAPHICS SOFTWARE

3G Graphics		**Generic Software**	
Images w/Impact Graphics & Symbols	59.	Generic CADD	89.
Images w/Impact Business 1	65.	Symbol Libraries:	Call
Adobe Systems Adobe Illustrator *88*	299.	**Graphsoft** Mini Cad +	***Special*** 519.
Adobe Fonts *(Various volumes)*	Call	**Informix** Wingz	269.
Aldus Freehand	349.	**Innovative Data Design**	
Altsys Corp. Fontographer 2.2	229.	Residential Construction	139.
FONTastic Plus 2.0 or KeyMaster	52.	Dreams	269.
Ashton Tate Full Paint	67.	MacDraft 1.2B	145.
Broderbund Print Shop	35.	**Letraset** ImageStudio 1.5	275.
Drawing Tables	75.	**MacroMind**	
Casady & Greene Vivid Impressions	69.	MacroMind Director	449.
Quill Pack *(vol. 8 & 20)*	105.	**Micro: Maps**	
Headline Pack *(vol. 10-12)*	145.	MacAtlas Hyper Atlas	64.
Modern Pack *(vol. 7, 14-18)* or Distinctive Pack *(vol. 8, 19-22)*	195.	MacAtlas Professional *(PICT/MacDraw Version)*	129.
Classic Pack *(vol. 3-6, & 13)*	195.	**Microsoft**	
CE Software Calendar Maker 3.1	27.	Microsoft PowerPoint 2.1	255.
Claris MacPaint II	99.	**Micro Spot**	
MacDraw II	309.	MacInteriors	***Special*** 199.
Claris Cad	625.	MacPlot Series:	Call



Dollars & $ense 4.0 by Monogram Software

Dollars and $ense, the complete financial management program. Balance sheet? Chart of accounts? Customized reports? Other features: Automatic double entry accounting, check printing, "what if?" bill paying, and import/export to/from most popular spreadsheets. If you'd like to make a positive financial statement or just an assessment of your personal value - let *Dollars and $ense* take charge of your finances. **$81.**

Cricket Software		**Miles Computing**	
Cricket Draw	167.	Mac the Ripper or Orchestra of Fonts	32.
Cricket Paint	95.	People, Places-Things or Taking Care of Business	32.
Pictograph	85.	**NuEquation** Nu Paint	95.
Cricket Graph	115.	**Olduvai Software**	
Cricket Color Paint	179.	Art Clip or ArtFonts 1, 2 or 3	55.
Cricket Presents	289.	**Paracomp** Swivel 3D	***Special*** 289.
Deneba Software		**Silicon Beach Software**	
Canvas 2.0 *(Includes Desk Accessory)*	159.	SuperCard	135.
Dream Maker		SuperPaint 2.0	129.
MacGallery *(Hypercard or Paint)*	27.	Digital Darkroom	195.
Cliptures *(vol. 1 or vol. 2)*	89.	Super 3D 2.0	325.
Dubl-Click Software		**Solutions International**	
World Class Fonts: Various Vol. 1-8 *(ea)*	45.	The Curator *(Catalog Your Art)*	75.
World Class Lasertype: Various Vol. 1-6 *(ea)*	45.	**Springboard** Certificate Maker	24.
WetPaint: Various Vol. 1-18 *(ea)*	45.	Springboard Publisher	109.
Electronic Arts Studio 8 *(MacII)*	309.	**SuperMac Software**	
Enabling Technology		Pixel Paint 2.0	199.
Clip 3D *(ea)*	57.	**Symmetry**	
Pro3D	285.	Picture Base & Wet Paint Bundle	85.
Foundation Publishing		**Synergy** KaleidaGraph	119.
Comic People	23.	**T/Maker**	
Comic Strip Factory	39.	Christian Images	35.
		Click Art EPS Illustrations	75.
		Zedcor DeskPaint 2.0	69.



Vantage by Preferred Publishers

Vantage is a powerful, special purpose text processor designed to respond to both the specialized and the mundane word processing tasks. *Vantage* can convert a wide variety of different word processing formats including Word, MacWrite and Write Now. .. **$59.**

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TOPS 2.1/InBox/FlashBox by TOPS

With ***TOPS ($149)*** you can transform any Mac with at least 512K of memory into a *TOPS* Network station. ***InBox ($149)*** enables users to send and receive messages, memos, and files over a *TOPS* Network. With ***FlashBox ($125)*** you can speed up your AppleTalk network and allow your Mac to communicate at the Flash talk speed of 770K bits per second.

HYPERMEDIA & LANGUAGES

Beacon Technology		**Smethers & Barnes**	
HyperBible King James	***Special*** 159.	Prototyper	129.
HyperBible International	***Special*** 195.	**Softworks** Stack Cleaner	29.
Borland Turbo Pascal	68.	HyperTools 1 or 2	58.
Bright Star Technology		**Symantec** Lightspeed C	165.
Hyper Animator	98.	Lightspeed Pascal	95.
Consulair		Just Enough Pascal	49.
Mac 68000 Dev. System	57.	**TENpointO** FocalPoint II	119.
Hyper Press Script Expert	49.	**T.M.L.**	
Manx Aztec C	65.	TML Pascal II V3.0	115.
Aztec C + SDB	99.	TML Source Code Library II	42.
Aztec C + MPW	99.	**Zedcore**	
Microsoft Quick Basic	69.	ZBasic 5.0	99.



StickyBusiness/DiskFinder/ myDiskLabeler by W&M

StickyBusiness ($99) solves your business labeling problems! It's the best general purpose labeling program on the market. Comprehensive text, graphics and merge capabilities plus preformatted templates for all popular labels, cards and tags. ***myDiskLabeler ($34)*** labels disks to keep you organized. ***DiskFinder ($27)*** is the desk accessory that instantly locates files on mounted or unmounted disks.

BLANK MEDIA

Single Sided 3½" Diskettes		Centech 3½" DS/DD Color Disks *(10)*	19.
Bulk *(Sony)* 3½" SS/DD Disks *(10)*	14.	Sony 3½" DS/DD Disks *(box of 10)*	16.
Sony 3½" SS/DD Disks *(box of 10)*	16.	Fuji 3½" DS/DD Disks *(box of 10)*	17.
Double Sided 3½" Diskettes		Maxell 3½" DS/DD Disks *(box of 10)*	17.
BASF 3½" DS/DD *(box of 10)*	17.	Verbatim 3½" DS/DD Disks *(box of 10)*	17.
Bulk *(Sony)* 3½" DS/DD *(10)*	17.	3M 3½" DS/DD Disks *(box of 10)*	20.



HyperBible by Beacon Technology

HyperBible makes Bible study easy and fun! Features include: 100,000+ marginal note entries which categorize verses into almost 5,000 topics, studies of each book, studies of all the major characters, archealogy articles, an electronic Bible Atlas, pronunciation of proper names. HyperCard based system. King James Version ***($159)***, New International Version ***($195)***.



Insight Expert Accounting Series by Layered Inc.

A series of stand-alone or fully integrated accounting modules for general ledger, accounts receivable w/billing, accounts payable, payroll, inventory control and time billing which gives you answers, advice and analysis. Now includes *Data Import!* **$409.**

WORD PROCESSORS & DESKTOP PUBLISHING

Access Technology Mind Write 2.0	95.	Letra Studio	289.
Mind Write Express	135.	LetraFonts *(Various Vol. 1-45 ea.)*	65.
Aegis Showcase F/X	199.	**Microsoft**	
Allan Bonadio Associates		Microsoft Word 4.0	255.
Expressionist 2.0	79.	**Paragon Concepts** Nisus	189.
Aldus Corporation		**Preferred Publishers**	
Aldus Persuasion	385.	Vantage	***Special*** 59.
PageMaker 3.0	389.	**Quark, Inc.**	
Ashton Tate		QuarkXPress V2.0	499.
FullWrite Professional	265.	QuarkStyle	189.
Broderbund		**Symantec** More II	255.
DTP Advisor	47.	**Symmetry** Acta Advantage	65.
Caere Omnipage	559.	**T/Maker Company**	
Design Science		WriteNow V2.0	109.
Math Type 2.0	99.	**U.S. MicroLabs** Font Sizer	79.
Emerald City Smart Art	***Special*** 95.	**Word Perfect Corporation**	
Letraset		Word Perfect	179.
Design Studio 1	459.	**Working Software**	
Ready, Set, Go! 4.5	275.	QuickLetter	75.



Muzzle by Ergotron

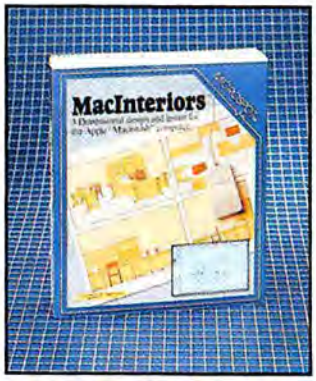
The ***Muzzle*** prevents data tampering, application theft and virus infection. The ***Mac II Muzzle*** locks the CPU cover protecting the internal hard drive/memory and expansion boards while the power cover prevents unauthorized use. The ***Mac SE Muzzle*** secures either or both floppy drives while the power cover prevents unauthorized use. **$62.**

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MacInteriors is for all of us who have ever wanted to do our own interior design. Now for the price of a typical 2D package you can have 3D space-planning software that let's you work and examine creations in several views (inc. perspective and bird's-eye), then print it out to a laser printer or plotter. You can create your own objects or use the ones provided. Soon you'll be designing everything from bedrooms to buildings. **$199.**



Aatrix Payroll Plus by Aatrix Software

Aatrix Payroll Plus is a powerful accounting tool that runs on any Mac with 512k memory and two 800k disk drives. It includes 1989 state/federal tax tables, the ability to print to any computer check form, on-line help and sets up for many income types. **$159.**

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ACCESSORIES

Cutting Edge	
Cutting Edge MCK-105QK Keyboard w/Quickeys	145.
DataDesk	
MAC-101 Keyboard/Beige *(128k/512k & MacPlus)*	***Special*** 145.
MAC-101 ADB Keyboard/Platinum *(Mac SE & Mac II)*	***Special*** 145.
Ergotron	
Mousecleaner 360°	15.
MacTilt *(Mac, SE or II)*	68.
Muzzle	***Special*** 62.
Farallon	
MacRecorder Sound System *(Mac SE or Mac II)*	135.
Goldstein & Blair	
Macintosh Bible 2nd ed.	20.
Impulse	
Audio Digitizer w/soundware	139.
I/O Design	
Mac Luggage in Navy or Plat.	
Macinware Plus Carrying Case	64.
Macinware SE Carrying Case	***Special*** 75.
Imageware II Carrying Case	49.
HDware *(Hard Disk Case)*	49.
Kalmar Designs	
Teakwood Roll-Top Disk Cases:	
Micro Cabinet *(holds 45 disks)*	14.
Double Micro Cabinet *(holds 90 disks)*	21.
Triple Micro Cabinet *(holds 135 disks)*	31.
Kensington	
Mouseway *(Mousepad)*	8.
ImageWriter or ImageWriter II Cover	9.
Macintosh Plus/SE Dust Cover	9.
Apple Security Kit	34.
Antiglare Polarizing Filter	33.
Mac II Stand and Cable Kit	65.
Mac II Monitor Stand	65.
Power Tree Surge Suppressors (10, 20, or 50)	Call
Printer Muffler Stand *(80 & 132)*	24.
Printer Muffler 80	43.
System Saver Mac *(Beige or Platinum)*	64.
Space Saver Printer Stand	17.
Super Base	34.
System Saver SE	52.
Masterpiece Mac II	105.
New Turbo Mouse *(Reg. or ADB)*	119.
Universal Copy Stand	22.
Universal Printer Stand	15.
Lynx Computer	
Turbo Trackball *(Mac & Mac+ or Mac SE & Mac II)*	65.
Mobius	
Fanny Mac QT *(Beige or Platinum)*	60.
Mouse Systems	
A+ Mouse *(MacPlus)*	65.
A+ ADB Mouse *(Mac SE/Mac II)*	85.
Moustrak	
MousePad 7" x 9" Size	8.
MousePad 9" x 11" Size	9.
Orange Micro	
Grappler Spooler	39.
Grappler C/Mac/GS or Alphabits	79.
Grappler L/Q or Grappler L/S	103.
Ribbons	
Available in Black, Blue, Brown, Green, Orange, Purple, Red, Yellow, Silver & Gold	
ImageWriter Ribbon	4.
ImageWriter Black 6-pack	20.
ImageWriter Rainbow Pack *(6 Colors)*	20.
ImageWriter II-Four Color Ribbon	9.
ImageWriter LQ Black	17.
ImageWriter LQ Four Color	20.
Seikosha Ribbon Black	6.
Targus	
Imagewriter II Carry Case Blk.	49.
Macintosh Plus Carry Case Blk.	59.
Deluxe MacPlus-XKB Blk.	75.



MultiDisk by ALSoft

MultiDisk is the utility which lets you effectively add disks through an innovative technique called disk partitioning. You can divide your original disk into multiple new disks. By grouping your files into these separate partitions, you'll get faster performance and protection against directory damage and virus attack. Your partitions can be resized, have a password and quick-encrypted for security. **$49.**



MBA Series by Generation Four

Multiuser collection of unlocked, open source code 4th Dimension business solutions: >NetMail (E-Mail, messages), >Clients (directory, contact log, mail merge), >Projects (projects, tasks, alarms), >MassMail (bulk mail), >Docu-Trak (media librarian), >Personnel (EEOC info), >TeleSell (telemarketing, support, order entry), >TraveLog (trips, expenses, mileage), >Inventory (mfg & retail), >ShipRec (shipping & receiving), >DistList (dist. lists). **$115 ea.**

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MacPrint by Insight Development

Introducing ***MacPrint***. An easy-to-use software utility that lets you use virtually any Mac application on virtually any printer. Including HP LaserJet II and IID. *MacPrint* displays all your printer's fonts for true WYSIWYG performance. After a simple installation, it's completely transparent in operation. It's the most cost-effective print option for your Macintosh. **$79.**

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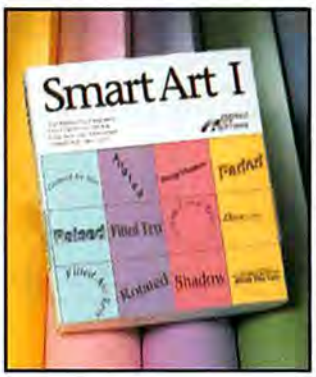
1 Meg SIMMS	Call	MacSnap 548S *(512E to 2MB w/SCSI)*	589.
AST Research		MacSnap Plus 2 *(MacPlus to 2MB Non Expandable)*	439.
Mac 86 Co-Processor	419.	MacSnap 2SE or 1024 Option *(1MB or MacII Memory Exp.)*	439.
Mac286 Co-Processor *(Mac II)*	1069.	SCSI Interface/Port	109.
CMS		**Everex**	
SD Ser. MacStack SD20 *(Mac+/SE/II)*	555.	EMAC-40IMP Plus	789.
SD Ser. MacStack SD30 *(Mac+/SE/II)*	595.	EMAC-60IMP	869.
SD Ser. MacStack SD43 *(Mac+/SE/II)*	785.	**Mobius Technologies**	
Cutting Edge		MultiScreen Video Card	349.
Cutting Edge 800k Drive	***Special*** 175.	**Personal Computer Peripherals**	
Cutting Edge Wedge XL 30 Plus SCSI Hard Drive	539.	*Platinum Color.*	
Cutting Edge Wedge XL 45 Plus SCSI Hard Drive	669.	*Optional Built-In Modems.*	



MicroPhone II V3.0 by Software Ventures

This stunning new version of the top telecom software for the Mac offers the most comprehensive collection of file transfer protocols including ZMODEM; unmatched power in scripting; color, sound and support for XCMDs and XFCNs. **$219.**

Dove Computer		MacBottom HD-21 *(20+MB SCSI Hard Disk)*	659.
FastNet Networking	Call	MacBottom HD-32 *(32MB SCSI Hard Disk)*	699.
Marathon 030 Accelerator	999.	MacBottom HD-45 *(45MB SCSI Hard Disk)*	789.
Marathon 020 Accelerator		MacBottom HD-70 *(70MB SCSI Hard Disk)*	999.
MSE 1 (16 Mhz)	585.	MacBottom HD 84 *(84 MB SCSI Hard Disk)*	1249.
MSE 2 (16 Mhz w/1MB)	979.	**Video Technology**	
MSE 3 (16 Mhz w/Math Co-processor)	779.	Laser 800k External Drive	185.
MSE 4 (16 Mhz w/1MB & Math Chip)	1159.		
MacSnap 524E *(512E to 1MB)*	289.		
MacSnap 524S *(512E to 1MB w/SCSI)*	379.		
MacSnap 548 *(512K to 2MB)*	459.		
MacSnap 548E *(512E to 2MB)*	549.		



Smart Art by Emerald City Software

Smart Art from Emerald City Software brings custom text effects to your favorite word processor, page layout or presentation program. With *Smart Art* you simply select one of the pre-programmed effects, customize it with the powerful, but simple controls, and place it in your document. *Smart Art* comes with the fifteen most wanted text effects for a word processor, desktop publishing and graphics design. **$95.**

ENTERTAINMENT SOFTWARE

Access		**Infocom**	
World Class Leader Board Golf	28.	Leather Goddesses of Phobos	15.
Accolade		Beyond Zork or HitchHiker's Guide	15.
Hard Ball or Mean 18	27.	Zork Trilogy or QuaterStaff	30.
4th & Inches	27.	Zork Zero	36.
Activision		**MicroPro** Pirates	32.
Universal Military Simulator or Manhole	30.	**Microsoft**	
Might and Magic	36.	Flight Simulator 1.02	32.
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Simplicity Patterns

As I often do when I'm supposed to be doing something else, I logged on to CompuServe. (I used to wax floors, but that's another story; besides, that wench is dead.) As I write this, a very interesting — and *long* — thread is going on in the Macintosh Professional forum (MacPro). It's called "The Coming Macs," and it began with Neil Shapiro's call to users to tell the world (or at least that part of the world that inhabits MAUG) what they want to see in future Macs.

It occurred to me as I slowly wended my way through the thread (I *know* I should use Navigator — soon) that from another perspective, we're all using the future Macintosh right now. What the Mac can do now was barely a gleam in Mr. Sculley's (or even Mr. Jobs') eye in 1984. In 1984, *Macintosh connectivity* meant the machine plugged into a wall socket. In 1984, the only peripherals for the Mac came bundled with it. From 1984 to 1985, picking software awards was simple: you gave the prize to products that (1) had shipped, (2) fit on one disk, and (3) worked. Hardware awards were even easier; there wasn't any hardware to reward, once you'd eliminated the extra floppy drive as a contender. Still, I think I could be pretty happy with a Mac and a Macintosh industry that made the same comparative advances in the next five years as they have to date. Some excellent and imaginative suggestions for how to achieve this are showing up on the MacPro board — Apple, take note — but roughly what it boils down to is more power, more speed, and more efficiency for less money.



ILLUSTRATION: ARNIE GUSMAN

I'd like to see at least that. But what I'd like to see more than anything else is a change in attitude here and there at Apple. It is attitude, after all, that determines most of the other choices an individual or an organization makes. What I'd like is to see some indication that someone at Apple is aware of the value of simplicity.

The major virtue of simplicity is that it's, well, simple. If we end up with Macs that are state-of-the-art in speed and power at the expense of the ease of use that is the Macintosh hallmark, no drop in price is going to compensate. Lately it seems as if Apple, along with much of the computer industry, is more interested in nifty new stuff for its own sake than in the more solid and reliable virtues. (You know — the ones that made this country great.)

Let's take the laptop, as many of the people replying on MAUG did. How come we can't just get a basic workhorse laptop out of Apple? Why do we have to wait until Apple figures out how to put a Mac IIcx into a 2-pound box? Why can't we just start small and simple? The minimum most folks want in a carry-on computer is data entry and telecommunications — writing and talking, the cornerstones of our lives. Something like a Z88 or a Toshiba 1000? Douglas Adams (of *Dirk Gently* and *Hitchhiker's Guide* fame) carries a lowly Z88, even though he is one of the most active and knowledgeable Mac users around. It's very light, and although it doesn't exactly fit in a pocket, it will go almost unnoticeably into a briefcase. Most *MacUser* editors carry a Toshiba 1000 with them on trips, if they carry a computer at all. Obviously, we wouldn't use DOS in any form if we had a choice, but in terms of cost, weight, and power, what choice do we really have? It worries me that Apple insists that it's developing a "portable" computer rather than a laptop. My Mac Plus is as carryable as my "portable" TV, which isn't very. It is telling that the first Mac portables came from third-party companies two years ago.

So I am — in my charmingly cranky manner — championing the KISS (keep it simple, stupid) approach not only for Apple, but for the Macintosh industry in general. As far as the laptop goes, give us the basics in an easy-to-carry and easy-to-use box that works reliably. That will keep us happy until Mac technology catches up with the DOS laptop world.

(In all fairness, I have to say that my neighbor, Larry Sharpe, an Apple consultant, thinks such a machine would be a waste of time. What he wants to do on a plane or on the road is program in 4th Dimension. OK, so make the LapTop II powerful enough to keep the programmers happy. But give us the simpler one first; there are more of us than there are of them.)

The love affair with complexity is widespread; it seems to come with the territory of technology. And although complexity is not inherently a vice, complexity for its own sake is at best counterproductive — especially if the complexity comes at the expense of,

The love affair with complexity is widespread; it seems to come with the territory of technology.



By Louise Kohl

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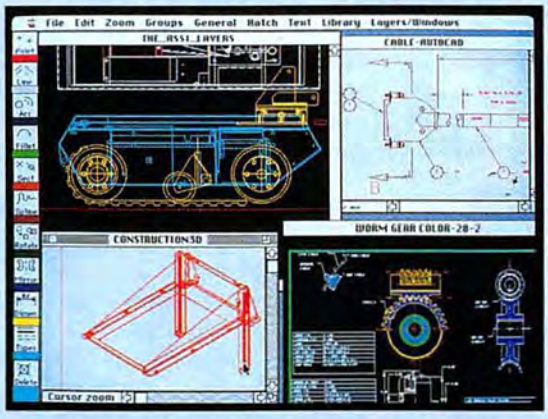
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***Byte Magazine* Review, January, 1988**



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or in the absence of, any underlying simplicity.

Let me give you a real-life example: Someone in the office complains that they can't print a document. Immediately, five technically inclined fellow workers are swarming all over the computer looking for subtle flaws, bad INITs, bad molecular bonding — whatever. In the background, you might be able to hear a quiet, but necessarily ineffectual, voice saying something like, "Anybody checked the AppleTalk cable? Gone into the Chooser to check the connection?" (Now, let me assure you that this situation is entirely fictional. Any resemblance to any real events or to any characters living, dead, or employed by *MacUser* is purely coincidental.)

Kohl's law for nonfunctioning electronic devices, however complicated or austere, is "If it doesn't work, first check the plugs."

Kohl's law for nonfunctioning electronic devices, however complicated or austere, is "If it doesn't work, first check the plug(s)," an obvious corollary to "If it ain't broke, don't fix it." Simpleminded, I grant you, but useful nonetheless.

So while those at Apple work away at all the improvements the folks on MacPro want to see — and I count myself among them — it would be nice if they could remember that the cardinal virtue of the Mac from the user's standpoint has always been simplicity and that that's as good a pattern for the future as it has been for the past.



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Five Years at a Glance

Sometimes it's the easy stuff that takes forever. I spend a lot of time on the road talking to Mac and PC user groups. A lot of ideas for these columns come from the bright, engaging people who run user groups across the country.

During one of those talks the other night, I was telling a group of Mac fanatics about my frustrating five-year search for a certain kind of program. As I recounted my misadventures, I saw a lot of knowing looks and grins. By the end of the story, people in the audience were finishing my lines for me.

Later, over coffee and sticky buns, I heard still more tales about difficulties finding what ought to be commonplace programs. A number of those present suggested that I pass along my wanderer's tale to you. People just don't realize, they said, that Famus Kolumnists have the same problems everyone else does. So here goes.

The category in which I was searching — personal appointment-calendar software, or desk-diary software — represents such a basic use of a business computer that I began my search late in 1983, naively thinking it would be easy to find what I wanted. In February 1989, I finally did.

It doesn't make much sense that it took five years to find an acceptable program. But my search proves instructive on several levels. First, it reflects the marginal attention paid by software vendors to certain kinds of software that they disdain as being beneath them, but which in fact represent potentially huge markets. Second, it's interesting to me — although probably not surprising to *MacUser* readers — that when I did find the right program, it was for the Mac, not the PC. Third, it's consistent with the personal computer software marketplace these days that the program I chose, from an established Mac software house, is about to migrate to the DOS world. Fourth, it's predictable that the DOS version will be neither as feature-rich nor as much fun to use as the Mac version. And fifth, the search illustrates how individual preferences often drive us to reject programs that others find perfectly acceptable.

What I wanted was an electronic datebook. My first criterion was that it offer very good paper output, because a datebook you can use only at your desk is worse than useless for anyone who travels. For me, the most important printout is a month-at-a-glance sheet, so I can tell how hectic my life will be over the next few weeks. And I want that monthly printout sufficiently detailed that I can see every daily appointment on it. Second, I hate programs with days divided into 15-minute appointment intervals from 8 A.M. to 5 P.M. My day doesn't fit that dentist's-office pattern — and probably not many of your days do either.

I began by wrestling with the appointment book in the old PC program Spotlight, from Software Arts, the TK!Solver people. It was mediocre. Next I tried Borland's SideKick, a widely used PC pop-up utility. It was worse than Spotlight. The Mac version of SideKick wasn't any better. Then Software Arts sold itself to Lotus Development Corp., from which emerged Metro, a modestly but insufficiently improved Spotlight.

Then Borland introduced Travelling SideKick, which at first seemed just what I needed. Maybe it was the sexy black leather binder, which out-filoFAXed the filoFAX people for panache. Unfortunately, it was incredibly lame, with a long list of shortcomings. My favorite gaffe: monthly calendar printouts can have only three events per day, with only ten characters for each! (I often wonder whether software developers actually ever use these things themselves.) I really liked the idea of HyperCard and Focal Point, not least because I like doing things on my Mac more than on my PC. And though I still shrink from the HyperHype and wonder about HyperHeads, HyperCard is an appealingly simple approach to such an inherently simple job as keeping a daily calendar.

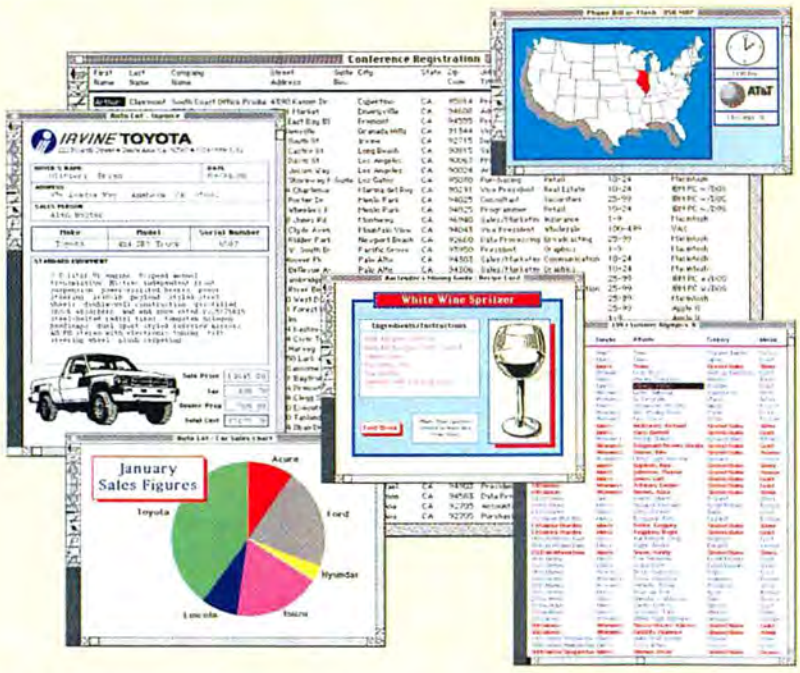
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BY JIM SEYMOUR

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Hyped Focal Point proved too feeble, especially in their printing options. (Sadly, this includes the new HyperHyped Focal Point II.) Along the way I also looked at dozens of dedicated desk-diary programs on both PCs and Macs. Many were work-group programs designed to keep many people's calendars (and allow everyone to snoop around electronically in everyone else's schedules). None made sense for a single user. Among those, Who-What-When, for the PC, and Rendezvous, for the Mac, were probably the best. But W-W-W is a resolutely nongraphic program — it's on the PC, right? — and can print only crude listings of appointments. And Rendezvous, which like W-W-W includes a huge and clumsy ring binder, is still copy-protected — and copy protection is a fundamental disqualifier, both an insult to users and a sign that the developer hasn't a clue as to users' needs.

To skip to the end, I wound up with Calendar Maker, from CE Software. An amazing bargain at $50, it does everything I want plus a lot more things that I don't need and will never use. I can see monthly calendars with a couple of clicks; I can access all the LaserWriter fonts, so printouts are both attractive and also as full of detail as my willingness to squint at small Helvetica permits. With Calendar Maker, I can print single months or a range of months almost effortlessly. And it works fine under MultiFinder, so it's available when I'm working with other programs.

I see, test, and use hundreds of new programs a year. The split these days is probably 60/40 PC/Mac. Though I see ever-increasing sophistication in terms of program size, complexity, and screen design, I long to see more programs unashamed to meet such fundamental and widespread needs of business PC users as keeping an appointment calendar.

The people at CE Software understand that need (and other real-world needs, as evidenced by their superb QuicKeys and DiskTop), and have ended my five-year gig as a techno-Diogenes searching for the elusive honest program.

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Desktop Mainframes



For 30 years, the one thing you could always depend on was for computers to get smaller, faster, and cheaper. And while the rate at which this happens shows signs of slowing, it looks as if it will continue to be true for at least another 30 years. The Macintosh has already eclipsed the huge mainframe systems of 25 years ago in speed and processing power, and it is closing in on the mainframes of only ten years ago. It won't be too many years from now when the Macintosh (or its successor) on your desk approaches the power of the mainframes of today.

Many people think that the era of "desktop mainframes" will mean the death of the large centralized mainframes. Of course, many thought the minicomputer was going to be the death of the mainframe. In fact, almost every significant advance in computer technology has been predicted by someone to mean the death of the mainframe. Yet there are more mainframes installed every year. Why does the mainframe hold on against all these technological assaults? The answer is simple, really: data.

A computer system has two major components — the computer (processor, memory, I/O buses) and the external data storage (disks, tapes). The major technological advances have been mainly in the computer component. Disks and tapes today are essentially the same as the disks and tapes of 20 years ago.

Several 300-megabyte hard disks, and even some hard disks with 600 megabytes and more, are available for the Macintosh now. But most mainframes have hundreds or even thousands of gigabytes (billions of bytes) of disk storage on-line as well as huge vaults of tape archives. Without this kind of very large data-storage ability, no microcomputer will ever cause the death of mainframes.

The storage limitations of the Macintosh were underscored for me by a recent product announcement. Ebbars Microcomputing Company of Miami is developing a system called HOPS (Heuristic Optimized Processing System), a new approach to database organization, indexing, and sorting that achieves performance improvements that are orders of magnitude better than existing products. These performance advantages get more pronounced the more records there are in a file, so database files of millions of records are still lightning fast. The prototype system runs on a Macintosh, so a demonstration with hundreds of millions of records is not really feasible, since there are few to no disks capable of holding files that large. The principals in the company are all Macintosh enthusiasts and are committed to the Macintosh, but they may someday see their product making mainframes faster instead of improving Macintosh performance, all because of the limitations of microcomputer disk storage.

Even if the disk storage capabilities of mainframes could be harnessed locally by desktop mainframelike computers, there are still many issues that make centralized mainframes attractive. Microcomputers and their programmers are just starting to learn how to share data, while mainframes have done this routinely for 20 years. Security, a major concern for most corporate users, is a gaping hole in most microcomputer software. Backup/recovery procedures and disaster recovery plans are much easier to implement and facilitate in a centralized environment than in one where the data is scattered hither and yon.

So what does the future hold? Desktop computers will continue to become more powerful. This will allow more processing to be off-loaded from mainframes. But centralization of corporate data will still be desirable, so the mainframes of the future are likely to be database servers to the desktop computers, where much of the processing will be done.

A critical component in future architectures will be communication links — another area that hasn't kept pace with advances in processor technology.

It will also be possible for companies to design true distributed databases (a dream of many database administrators), where departmental or branch data is stored on local micro-based database servers and aggregate data is stored centrally. This type of design would have the benefits of local processing (like speed and isolation from host system problems) while still reaping most of the benefits of centralized data storage. Mainframe servers could also be used as backups for local node databases.

The kind of cooperation required between the mainframes and the desktop computers will mean that designers of both kinds of systems will have to be con-



By Robert R. Wiggins

ILLUSTRATION: JENNIE OPPENHEIMER



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cerned with the capabilities of both. Since IBM makes both mainframes and desktop systems, it has a head start and is working on strategies for the future based on OS/2 and Systems Application Architecture. If Apple wants to be involved in the true distributed systems of the future, it needs to continue to explore these issues. Apple has started to move in this direction with products like MacWorkstation and MacAPPC, and its strategic alliance with Digital Equipment is intended to continue in a similar direction.

A critical component in the architectures of the future will be communication links, another area that has not kept pace with advances in processor technology but which is trying to catch up. Without advancements in the commercialization of technologies such as fiber optics and ISDN, the vast amounts of data that will need to be transferred between mainframes and desktop mainframes will become a major stumbling block to true distributed and peer-to-peer systems.

Centralized mainframes haven't died yet, and it will take more than desktop mainframes to kill them. The role of the mainframe will change over time, but it will survive for some time to come. The real question is whether Apple will be able to move far enough and fast enough in the right direction to be ready for the changed world the desktop mainframe will inhabit. Time, as they say, will tell.

Pinstripe Picks

Some products that you may want to investigate if you need to connect your Macintosh to an IBM mainframe now:

Netway 1000 and 2000 (TriData). These units take the place of 3274 remote controllers (and at attractive prices) and let you use Macs on an AppleTalk network as 3270 terminals. Software allows multiple sessions per Macintosh.

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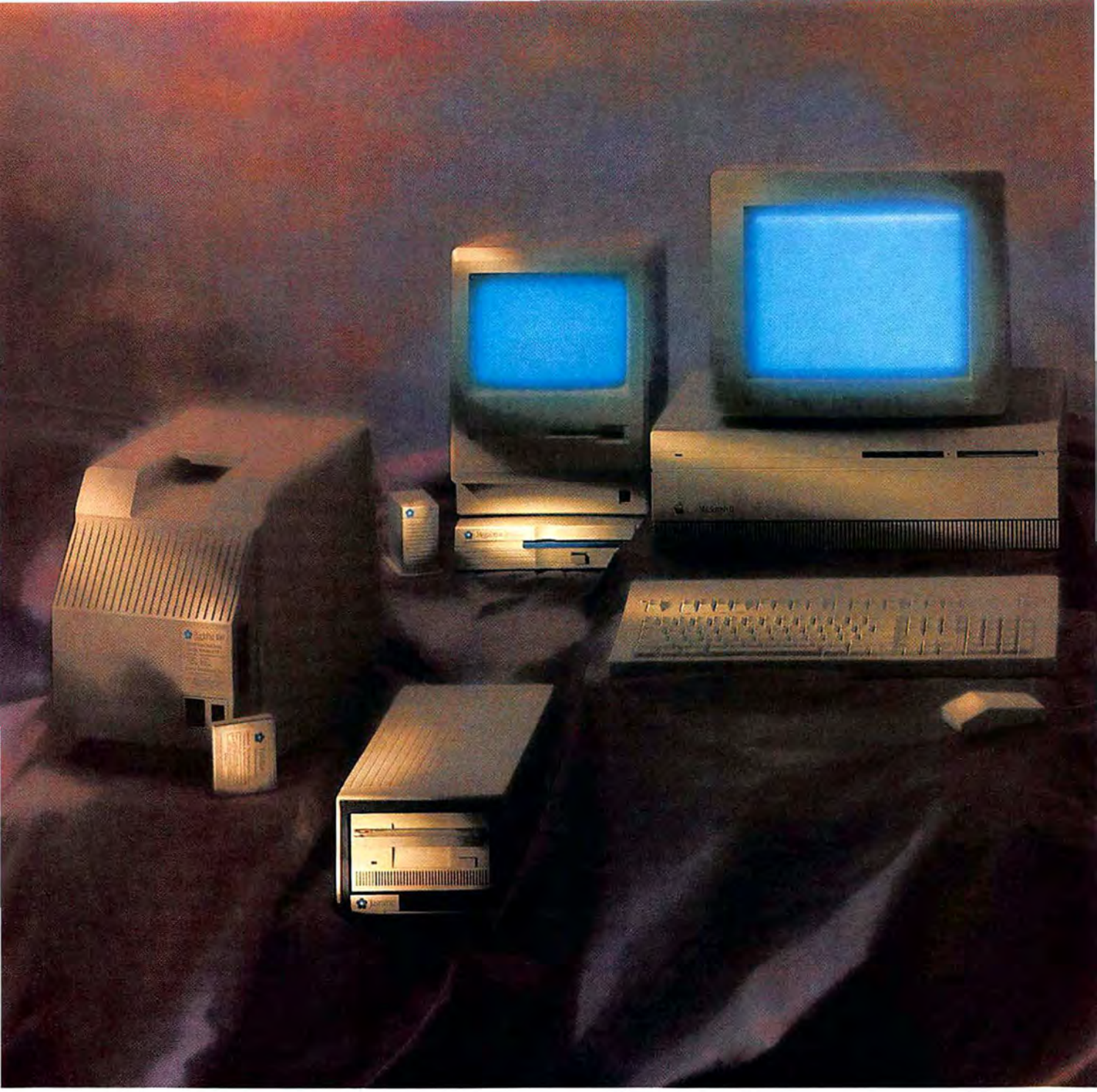
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The Labtop Mac

From the university lab to the corporate world, gathering data is central to research, control, and analysis. Here's a look at key data-acquisition packages on the Mac.

By John Rizzo



Let's face it: data acquisition isn't one of the more glamorous personal-computer applications. The phrase conjures up an image of spectacled technicians in white lab coats with pocket protectors, locked away in a lab crowded with blinking equipment. The fact is, data acquisition and control are the most popular applications for add-in boards on the Macintosh. More than 100 Mac data-acquisition hardware and software products are on the market, and the number is continually growing. The reason: somewhere in most big companies and universities, people are acquiring data, in fields ranging from finance to manufacturing.

What distinguishes Macintosh data acquisition from the PC variety is the Mac's graphic interface. Although data-acquisition hardware for the Mac is similar to its PC equivalent, the data-acquisition software for the Mac has freed users from having to deal with lines of code. Charts and indicators have moved from an army of instrumentation to the Macintosh's screen. Much of the software enables the Mac to replace instruments such as



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strip-chart recorders. As a result, instead of having only a piece of graph paper at the end of a test, you have computer data that can be not only graphed but also analyzed.

To understand how a Mac acquires data, you should know that data acquisition is basically collecting information that varies with time. The time can be long, such as the weeks one could wait for an error condition in a chemical process, or it can be short, such as the milliseconds it takes for a muscle to respond to an electrical stimulus. The data collected could be pressure and temperature variations inside a chemical-processing tank, hourly stock prices for a series of companies, or signals from electronic equipment undergoing a burn-in test. The data can then be analyzed by computers or people for trends or aberrations.

A test station can use a Mac to record how a product reacts to different conditions it is expected to withstand. For instance, a radio designed to be used in the shower could be placed in a humidity chamber. The Mac could monitor signals from wires connected to one or more circuits in the radio. Software on the Mac could determine the best-fit equation of measured parameters to see if the radio was behaving properly.

A production line can use data collected for process control. In this case, a Mac would react to the data that deviated from an acceptable range of values. For instance, it could send out signals to close a pipe valve if the temperature rose too swiftly, or to send a message to a broker to sell a stock if its price dropped too rapidly.

All these possibilities underline a preliminary task: when choosing data-acquisition software, you should first define your needs. You might be able to use more than one package. Are you performing a wide variety of tasks, or is your task confined to one area? Would you like your Mac to measure and control a battery of instruments, or are you monitoring just a few simple variables? Do you need a waveform readout or a database of numbers? What types of analysis do you need?

We'll look first at three general-purpose data-acquisition products that are roughly competitors: National Instruments' LabVIEW package, Strawberry Tree's Analog Connection Workbench, and LabTech Notebook from Laboratory Technologies. These products enable you to create your own data-acquisition applications. Next, we'll look at Parameter Manager Plus (recently acquired by GenRad from Rebus Development), a package that you can use to analyze and present data after you've collected it. Finally, we'll look at a class of data-acquisition software that transforms your Macintosh into an oscilloscope.

LABVIEW

The most complex and powerful off-the-shelf data-acquisition software is LabVIEW, an acronym for Laboratory Virtual Instrument Engineering Workbench.

LabVIEW is based on the concept of the *virtual instrument,* a software emulation of test equipment that creates, analyzes, and displays data much as physical instruments do. It gives you capture and analytic ability without requiring you to have access to expensive dedicated test equipment. You can also interface to instruments conforming to the IEEE-488 GPIB (general-purpose interface bus) standard (see sidebar, "The Hard Side of Data Acquisition").

LabVIEW is designed to work with National Instruments' series of internal Mac boards (GW Instruments also has a driver for the software) and is a revolutionary programming environment that's popular among both scientists and engineers. Its power is in its programming language, called G, which is a true graphics language. Instead of typing in lines of code, you manipulate objects — the objects *are* the code and are compiled directly into machine code.

LabVIEW lets you create applications for automatic data collection and management (including some database functions), signal and transient analysis, and process control. Applications you create can generate signals, perform complex tests, and perform advanced math functions.

Each file is a virtual instrument. You can create your own virtual in-

struments or use one of the several hundred that come with the package. Virtual instruments are modular: you can use them as part of other virtual instruments. Prototypes can be quickly created and easily modified. If you want to use one virtual instrument as part of another virtual instrument, you design an icon for it with the Icon Editor. Then, when in another file, you can place the icon you designed into a new block diagram.

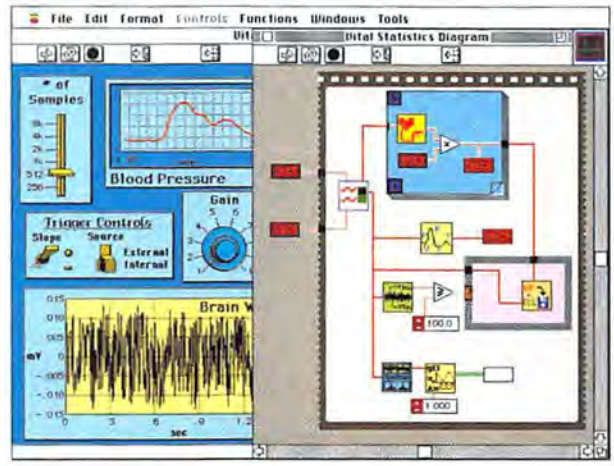
Two windows are used for creating virtual instruments. The Panel window resembles an instrument control panel (once you've created it) with working switches, knobs, indicators, and graphs, all available from menus. The other half of LabVIEW is the Diagram window, which resembles a block diagram and is where most of the programming is done.

Choosing items, filling in parameters, and wiring them together (using the Wiring tool) are the tasks that comprise programming in LabVIEW. When you create a control item in the Panel window, its block diagram equivalent is created automatically in the Diagram window.

Parameters are also chosen from menus. LabVIEW makes extensive use of intelligent pop-up menus, which are called up with a Shift-click. What menu comes up depends on what icon it is and where on the icon your cursor is. This takes some getting used to, since there are generally no keyboard equivalents, but I found that I had memorized how to call up needed menus after a day or two of working with LabVIEW.

The Structures and Constraints submenu in the Functions menu contains much of the graphics language. Here you find graphic elements representing programming concepts such as nested loops, arrays, and a software implementation of shift registers. The symbols for some of them are complex, with multiple active areas and several layers. They take a little time to learn, but once you've mastered them, you can design and revise your programs far faster than with conventional code.

The built-in math capabilities are impressive and include complex numbers (numbers containing the square root of –1), hyperbolic functions, statistics, calculus, and normal and vector algebra. LabVIEW can also perform math on numbers accumulated in arrays. You can program algebraic formulas by using the Formula box icon in your block diagram and typing the formulas in the Diagram Variables box.



LabVIEW's Panel window can contain output and controls that you can change in real time. The "code" for this virtual instrument is contained in the Diagram window.

Data-logging capabilities include automatic recording of data to disk and interactive or programmatic data retrieval. When in the data-logging mode, the program creates a database that is attached to the virtual instrument file. This database can then be accessed in a variety of ways or exported to other Mac applications. Exporting can be made automatic, and you can program a virtual instrument to create and write a new file to a disk. The Utility disk contains useful virtual instruments such as Matrix to Spreadsheet, which creates an ASCII file that Excel can read.

If you make an error in design that prevents the virtual instrument from running, LabVIEW will tell you what is wrong by giving you an error message on the Panel window. "Bad" wiring is shown as a dashed line, and nonfunctioning virtual instruments are grayed out. A pop-up menu on the trouble spot will give you more detail. I do wish that the Delete key (Backspace on older Macs) would delete objects. Instead, you must choose Clear from the Edit menu or press Control-B.

The on-line help is extensive and very well implemented. You simply choose the Help tool (a magnifying glass) and point it at an icon, connection, or anything else on the screen. The Help screen pops up with a discussion of whatever you pointed at.

As intuitive as the graphics programming is, LabVIEW's G is still a new programming language for even experienced programmers and takes some time to master. National Instruments offers a three-day training course, which is probably a good idea for users who want to get the most out of LabVIEW. (The course costs $495 per person or $5,000 for 15 people, conducted at your site.) The thorough reference manual is well laid out as a tutorial for the beginner. The tutorial examples increase in complexity and cover a wide variety of functions and structures.

For those who still have version 1.0, version 2.0 is available as a free upgrade and is well worth it. The upgrade offers color, the ability to run as a background task, and (thanks to an added compiler) greatly increased speed. A run-time system is also included that allows developers to distribute stand-alone applications developed with LabVIEW without the full-fledged LabVIEW application itself.

ANALOG CONNECTION WORKBENCH

Not everyone needs all the complex data-processing capabilities of LabVIEW. Analog Connection Workbench is also an icon-based application generator, but it's much simpler to use than LabVIEW. You don't have all the programming options of Lab-

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VIEW, but you can start using Workbench at your lab on the same day you tear off the shrink wrap.

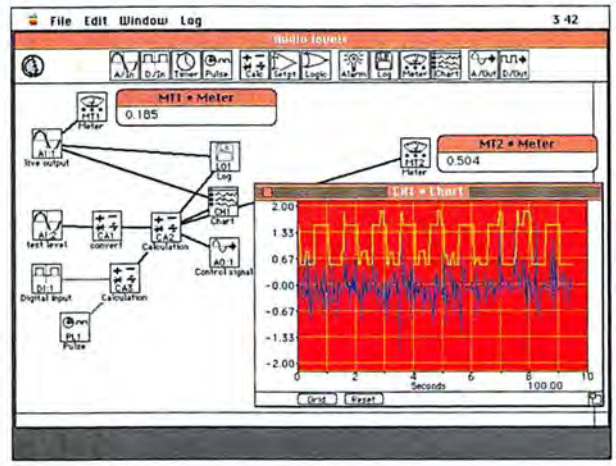
Workbench elegantly handles analog and digital inputs and outputs, logs data to a disk, and performs process monitoring and control. It can turn your Mac into an electronic data logger/strip-chart recorder. In a way, it's a subset of LabVIEW, but the subset is more specialized for things such as logging temperature, pressure, and flow. Workbench works with GPIB devices as well. You can design process-control applications to turn on things such as pumps, fans, and heaters. Workbench cannot perform calculations as complex as LabVIEW can, but it does handle trigonometry, third-order polynomials, and Boolean logic. There is also a pulse-signal generator.

Like LabVIEW, Workbench lets you read data on-screen and log it on to a disk at the same time. You can then "play back" the recorded data at the same rate or at a different one for reanalysis or simulations.

Thirteen predefined icon functions sit under the menu bar. They represent a timer, math and Boolean logic functions, meters, charts, alarms, a function that logs data to disk, and analog and digital inputs and outputs to and from Strawberry Tree's hardware. Double-clicking on these icons brings up the Help screen. To create an application, you drag icons down to the worksheet window. You can drag as many of each icon as you need, and Workbench numbers them for you.

Double-clicking on a worksheet icon displays a window for entering its parameters. For instance, the Analog Input icon lets you choose the voltage, current, or temperature readings and their ranges. You have ten kinds of thermocouples to choose from, each listed at 25 millivolts and 50 millivolts. You can also choose one of 15 resistive temperature device (RTD) settings. (RTDs are electrical temperature-measuring devices, similar to thermistors, that change the electrical resistance with the temperature.) Channel numbers are automatically set sequentially if you have more than one I/O for the icon.

Data can be displayed in windows associated with the Meter, Chart, and Alarm icons. Numbers continually flash in the Meter window when your application is running. The Chart function is like a strip-chart recorder, with a continually redrawing graph. Each chart can display up to three channels of data.



Real-time data is continually displayed in Analog Connection Workbench's Graph and Meter windows, even while you modify your application in the window behind it. Double-clicking on the function icons enables you to change parameters.

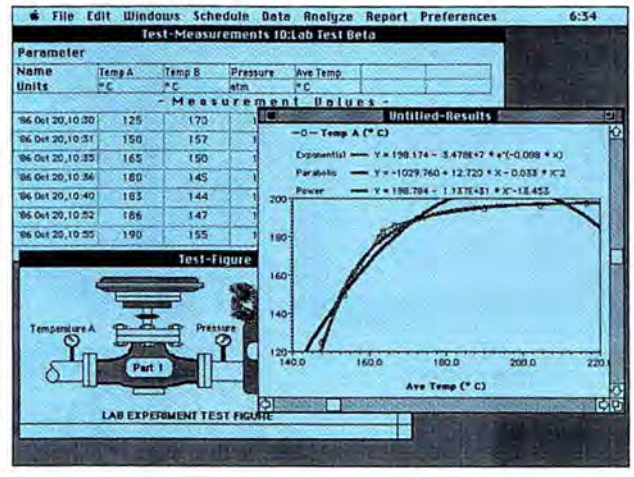
You can choose from eight colors for the signal traces and background and set three ranges on the time axis: seconds, minutes, and hours. (Some of the oscilloscope programs that will be mentioned later on go to microseconds.) Alarms let you know when a signal has done something that you didn't want it to.

The Log icon can be used to create an ASCII file of multiple channels of data. The file can then be opened with Excel. Each item input ends up in a column, and date and time stamps can appear for each data point. A printout of the block diagram can be obtained with the Print Worksheet command on the File menu.

Strawberry Tree has included many details to make your life easier. For instance, you can use the Delete key to remove connections and icons (you can't in LabVIEW). Charts, meters, and alarms can remain active while you work on a worksheet underneath. All in all, Workbench is a clean and immensely useful program to have around the lab.

LABTECH NOTEBOOK

LabTech Notebook is a popular PC product that has recently been ported to the Mac. It can perform many of the same signal-processing, number-crunching, and process-control functions that Workbench can, with one big difference: the graphical interface. Notebook can log and display data in color as it comes in, but there are no block diagrams, icons, or switches.



Parameter Manager Plus organizes each channel of data into a time-stamped, spreadsheetlike column. The right window graphs two parameters against each other and finds the best-fit curve for several types of equations. The figure is a MacDraw document linked to the pmPLUS file for reference. Version 4.0 will add drawing tools and color.

The Hard Side of Data Acquisition

The raison d'être of data-acquisition hardware products is to provide D/A and A/D conversion for both input and output. Analog signals from a device measuring muscle signals or from a thermocouple need to be converted to digital form to be processed by the computer. You may also need to output analog signals to control certain types of equipment.

Most data acquisition and control begins with sensors. Transducers such as thermocouples, strain gauges, and fluid-motion sensors produce electrical signals, which can be moved into a Mac by importing directly to a data-acquisition board or importing signals through equipment that is part of GPIB (general-purpose instrument bus).

GPIB has been around for two decades and boasts high data-scan rates of up to several hundred megahertz. If you require frequencies in this range or already have GPIB equipment, buy GPIB-compatible hardware. Otherwise, save money with straight D/A and A/D converters. GPIB converters for the Mac are offered by several vendors, including National Instruments and Keithley Instruments. Strawberry Tree recently added GPIB to its hardware and software lines. IOtech offers a GPIB interface that can be used with other vendors' A/D converters. Versions are available that plug into the Mac's SCSI and serial ports, as well as a board for NuBus. GW Instruments also sells serial-connect boxes, which, though slow, are the only way to do data acquisition with 128K and 512K Macs. A/D boards have slower sampling rates than GPIB; the highest, from National Instruments, runs at 1 megahertz. This August BioPac Systems will introduce its first NuBus board, NuScope, with a sampling rate of 40 megahertz.

Vendors are doing several things with memory access to prevent data-acquisition tasks from monopolizing the Mac. National Instruments uses DMA (direct memory access) between the board and the Mac's RAM. This technique bypasses the computer's main processor, allowing it to perform other tasks such as data analysis.

Data Translation has a DMA-like solution for its TopFlight line of boards. Software is used to move blocks of data from 512K of on-board RAM to the Mac II's memory, resulting in a sampling rate of 750 kilohertz.

Keithley has an external box, the model 556, that connects to the Mac and houses the existing line of PC boards. The 556 dynamically assigns buffers to each card and performs memory-management tasks, thus freeing up your Mac's CPU for other tasks. By chaining together up to fourteen 556 boxes and placing up to ten data-acquisition cards in each box, users can give a Mac thousands of inputs and outputs.

GW Instruments' MacAdios II board for NuBus is a 16-channel A/D and D/A converter with three slots for the addition of 11 daughterboards that can add sampling speed, resolution, or new features. A lower-cost model comes without the expansion slots. GW also supplies an internal board for the SE and external devices for SCSI and serial ports. GW does not support GPIB.

Strawberry Tree's hardware offers precise voltage compensation for ten types of thermocouples as well as expandability and self-calibration. The boards also have the advantage of working with the Analog Connection Workbench software.

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Do you own WriteNow?	☐	☐
Do you own Word Perfect?	☐	☐
Do you own MindWrite?	☐	☐
Do you own any version of MacWrite®?	☐	☐

If you answered yes to any of the above questions, you qualify (not exactly rocket science, was it?).

And you can get MacWrite II (a $249 value) for only $75, or $65 for registered MacWrite 5.0 owners. To find out more, follow these simple steps: look at the number below, pick up your phone and dial.

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You can't make changes without dealing with many layers of dialog boxes.

Notebook starts with two windows: Channel List and Schedule List. *Channels* specify the type of signal (such as analog, digital, or thermocouple) and its parameters. *Schedules* specify the sampling rate and duration. Setting these up is not self-evident and requires attentive study of the manual.

After setting up channels and at least one schedule, you must set up the displays and link them (again, with dialog boxes) to the channels and a schedule. You have a choice of eight colors for the background and signal, but the commands are buried in dialog boxes within dialog boxes.

To start a "data run," you select Go from the Run-Time menu. Go, which displays and logs data, is actually a separate application. The only thing you can do while the data is being displayed is to quit Go; you can't make any changes while you monitor the data. When the data run is over, the graph disappears, and you get a blank screen. If you want to see the Channel and Schedule Lists, you must reselect them from the Channel menu.

The signal-processing math is not as advanced as LabVIEW's, but Notebook does do differential calculus and polynomials. Calculated Channels are used in the latter case. You assign a simple calculation to each channel in turn and add channels together, gradually building up an equation.

Using Notebook's dialog boxes is probably easier than typing commands, but it would be nice if the program stuck more closely to Mac interface conventions. For example, it doesn't use default buttons that you can click by pressing Enter or Return. In fact, pressing Enter after typing in a setting usually (but not always) results in an unknown-character box (□).

Furthermore, the manual gets a little tedious after a while. Most Mac software manuals contain the disclaimer "if you don't know how to use a Mac, read Apple's manual," but the Notebook manual goes into painstaking detail on topics such as how to change the size of a window and how to open a file.

Hard-Hat Macs

If you're applying data acquisition and control to a production line where welders' sparks are flying and heavy machinery is moving about, a standard plastic Mac might make you just a bit nervous. One solution is the AI90, a factory-hardened Mac from Automatix. The AI90 is a Mac II in a 21-x-17.5-x-8.5-inch shielded steel case that can be mounted on a desktop stand or in a 19-inch rack. The case has filtered ventilation and is drip-proof between 5 percent and 95 percent relative humidity, according to the NEMA-2 spec (the National Electrical Manufacturers Association standard, which specifies drip-proof enclosures).

An alternative is GreenSpring's RackMac, a steel-encased Mac II packaged to fit in a 19-inch rack. RackMac features a washable air filter, enhanced cooling, and O-ring seals to cover the floppy-disk drive opening.

For those with military applications, Atlantic Research's TEMPEST-hardened Pluses, SEs, IIs, and monitors might do the job. The machines in its product line are the same shape as normal Macs, but they conform to the military's TEMPEST specifications.

Atlantic Research Corp.
TEMPEST Division
5390 Cherokee Ave.
Alexandria, VA 22312
(703) 642-4280
TEMPEST Mac SE *(price not available)*
TEMPEST Mac II *(price not available)*

Automatix
1000 Fech Park Drive
Billerica, MA 01821
(508) 667-7900
AI90*, starts at $9,600*

GreenSpring Computers
1204 O'Brien Drive
Menlo Park, CA 94025
(415) 327-1200
RackMac 1200 (Mac II)*, $8,950*
RackMac 1240 (13-inch color monitor)*, $2,150*
RackMac 1230 (mouse and keyboard drawer)*, $700*
RackMac 1250 (13-inch color monitor with touch screen)*, $3,450*
1270 SupportBoard (I/O board)*, $295*
SpringBoard (coprocessor board)*, $1,495*

LabTech Notebook runs very well under MultiFinder as a background task. In general, it can be a productive tool, but it will take you longer to learn, use, and troubleshoot than either LabVIEW or Workbench, without being as versatile as either of them. The closest thing you get to a flow diagram is a table under the Verify Setup menu item on the File menu. It would be nice to be able to print this table, but there are no printing facilities at all! LabTech has promised interface upgrades, but until then, version 1.0 is just not up to snuff.

PARAMETER MANAGER PLUS

The Parameter Manager Plus package (pmPLUS) differs from the previously mentioned products in that it is designed to analyze previously collected or even hand-entered data. (You can collect data in real time with the program's RS-232 module, pmTALK.) Imported data forms a date- or time-ordered database that is set up in a spreadsheetlike format. (Data can be imported from Excel.) GenRad has versions of Parameter Manager that can import data directly from a variety of hardware including boards from Strawberry Tree, National Instruments, GW Instruments, Data Translation, and IOtech. When running with pmTALK, pmPLUS also supports GPIB devices.

Data can be analyzed with one of ten statistical and other functions. You can instantly produce a variety of charts and graphs, predict trends, and produce a report that shows what your data means. You can attach a MacDraw file, or any other PICT document, as a reference figure to a database to clarify issues on-screen or in a report.

Each column of the "spreadsheet" contains one type of data, and each row is a time or date point. Through use of attached forms, you can specify everything you need to automate the analysis.

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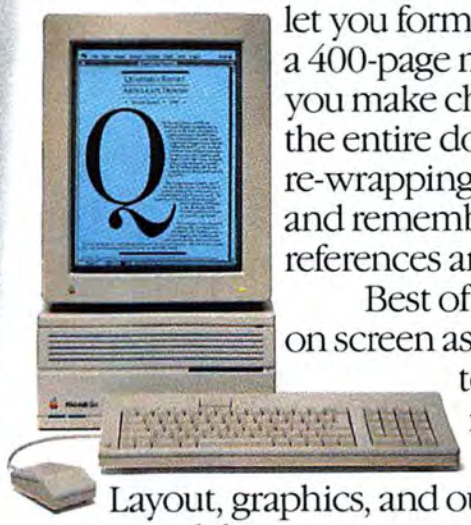
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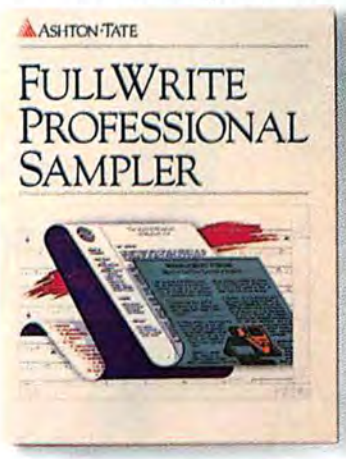
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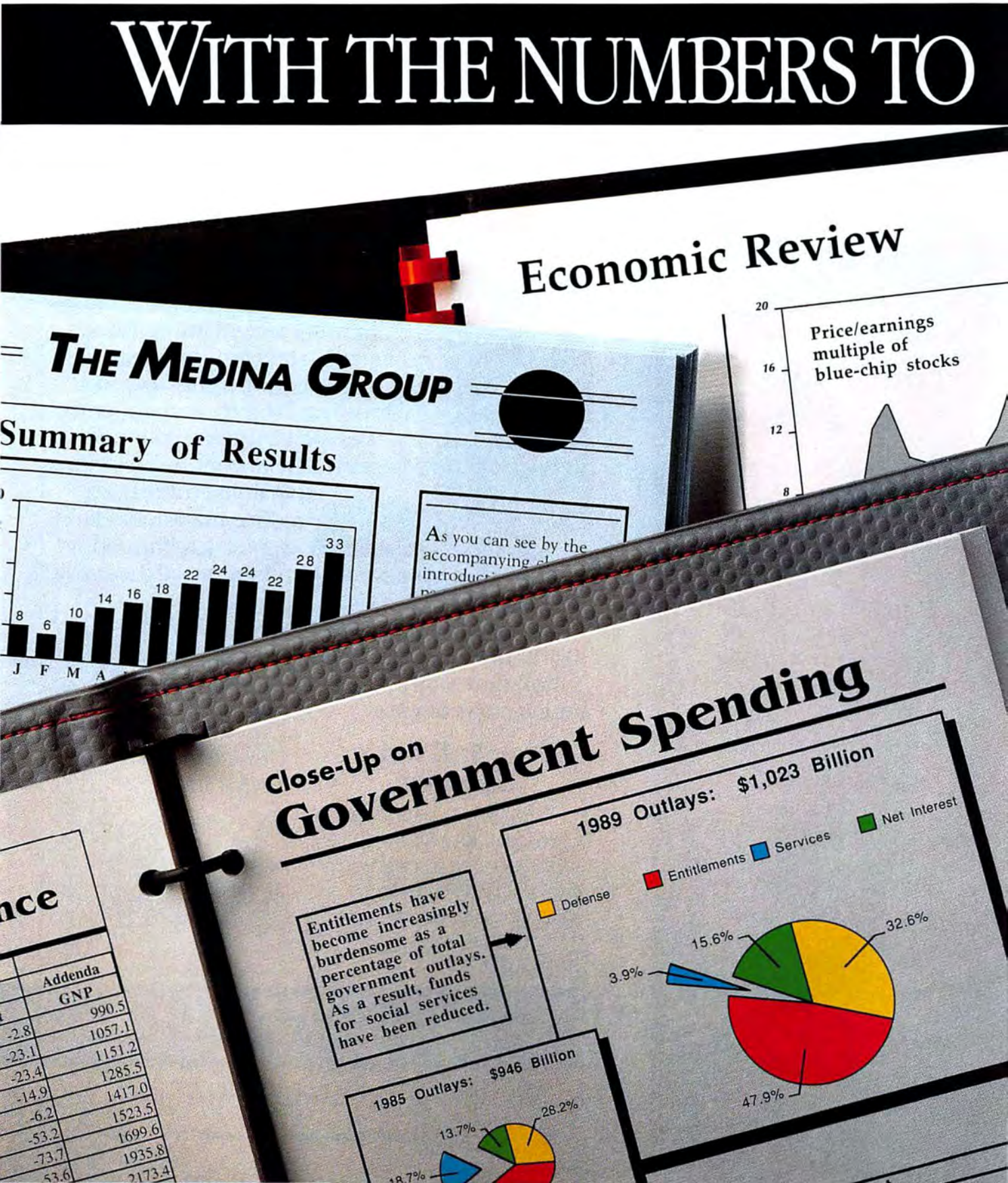


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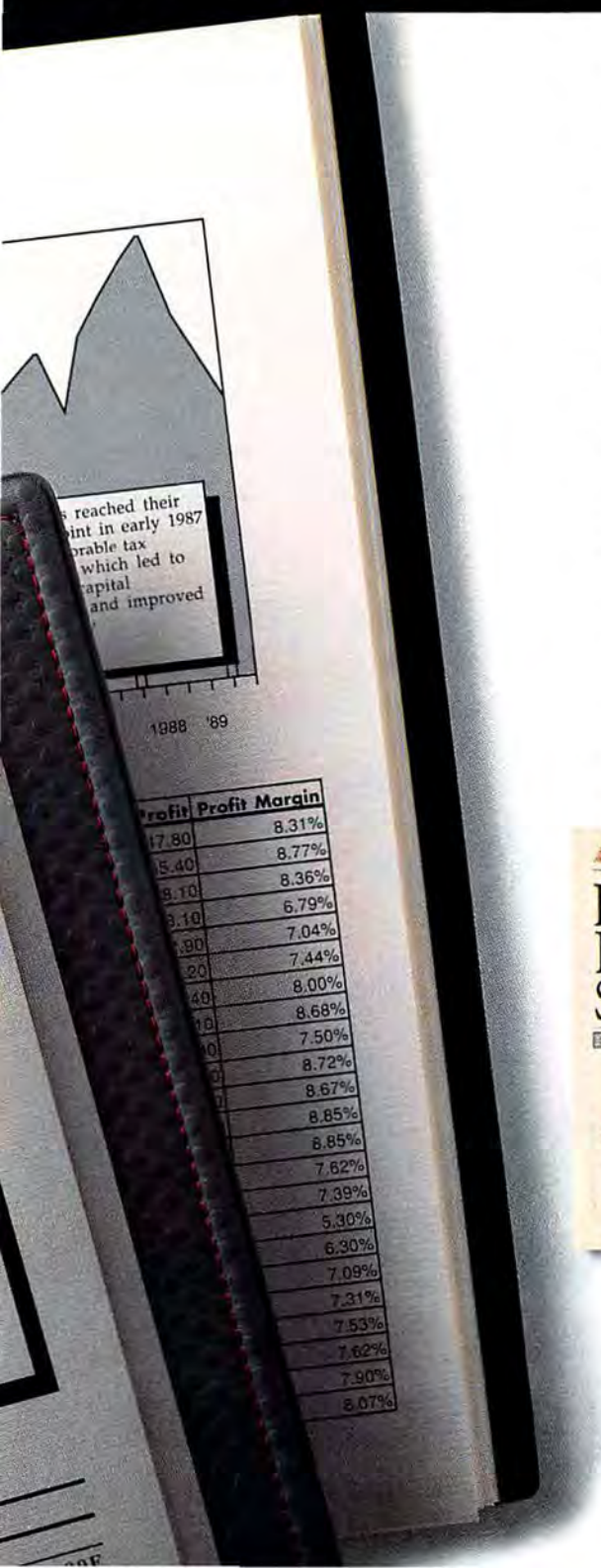
WITH THE NUMBERS TO



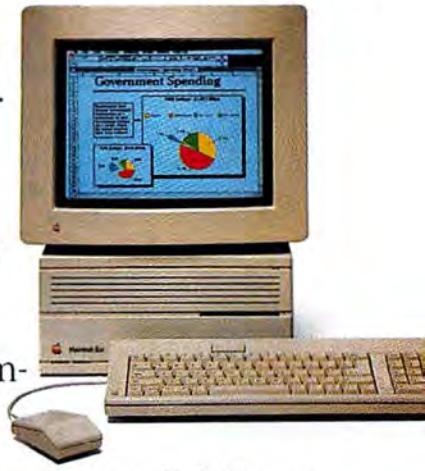
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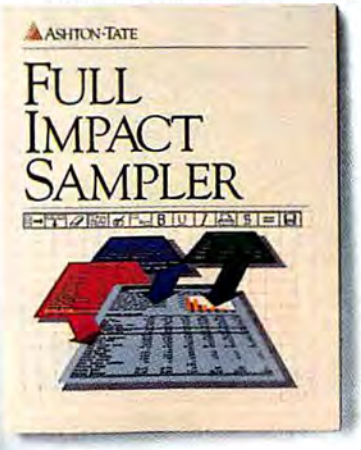
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Data-Acquisition Hardware

	General-Purpose		
Manufacturer	**Data Translation**	**GW Instruments**	**IOtech**
Names	**DT2200 series**	**MacAdios**	**Mac488, others**
Number of products	9	47 (modular system)	8
IEEE-488 GPIB available?	no	no	yes
Price	$895 to $3,795	$700 to $4,500	$395 to $995
Internal NuBus model?	yes	yes	yes
Internal SE version model?	no	yes	no
SCSI or serial available?	no	yes	yes
Highest-End General Configuration*			
A/D converter	16-bit	16-bit	none; controllers only
D/A converter	2 12-bit	16-bit	4 12-bit
Analog input channels per board	16	112 with 3 daughterboards	none (GPIB inputs)†
Analog output channels per board	2	2 12-bit, 6 16-bit with 3 daughterboards	4
Digital I/O channels per board	16	112 with 3 daughterboards	16
Counters/timers per board	2	3	1
Maximum sampling rate (input)	750 kHz	833 kHz	NA

*Highest-end configuration figures reflect the highest performance available from each company's product line. Sometimes several boards are required to get all of these features.
† Allows 14 analog input devices to be attached.



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			Oscilloscope Emulators	
Keithley Instruments	**National Instruments**	**Strawberry Tree**	**BioPac Systems**	**World Precision Instruments**
Model 556, others	**NB series, others**	**ACM2 and ACSE series**	**MacPacq, NuScope**	**MacLab**
26	21	11	1 model, 5 extra modules	1
yes	yes	yes	no	no
$110 to $1,800	$245 to $1,895	$490 to $1,845	$1,195 to $2,000	$2,925
no	yes	yes	(due in August)	no
no	yes	yes	no	no
yes	yes	yes	yes	yes
16-bit	16-bit	16-bit	12-bit	12-bit
5 12-bit or 2 16-bit	6 12-bit	none	1 12-bit	12-bit
32	16 (more with multiplexers)	16	2	4 (8 by May)
5	6	2	1	1 (2 in May)
32	32	16	8	none (planned for May)
8-channel module	3 16-bit channels	1 16-bit	none	no
8 kHz	1 MHz	500 kHz	40 MHz in v. 2.0	40 kHz (80 in May)

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trol (SPC) tool. SPC plots several statistical functions against time. From these you can determine which deviations from normal are acceptable and which are not, pointing out problems with a production line. SPC is also handy for doing predictive maintenance. In this case, measurements done by hand over time are entered on the keyboard. Using this tool and plotting the measurements, you could look for trends and replace parts before they failed, thus keeping equipment running longer.

Other graphs in pmPLUS include trend and forecast plots, histograms, and a correlation chart indicating coefficients and covariances. One chart plots points and their highs and lows for a given period, like a newspaper's stock-market chart. And there are also plots of median, average, and standard deviation.

A parametric plot lets you plot two variables against each other and find the best equation to fit a linear or nonlinear curve. For example, if you were measuring both temperature and pressure, you might want to plot one against the other (instead of against time) to see how temperature affected pressure. Best-fit equations are useful to engineers because the coefficients often describe properties of the subject under test. The best-fit equation is also a way to "smooth" data (eliminating deviations from a curve) for further analysis. You can then use the Forecast command to predict when a parameter (such as pressure) will exceed a certain value.

The Graph Template feature enables you to customize the plots, specifying type, size, grid, and other parameters. A global template specifies the parameters of a group of graphs you are creating. Version 4.0, due in May, was to add color and a MacDraw-like graphics tool palette.

With pmPLUS, you can generate reports at the pick of a menu item. These reports can range from a summary of the entire database to an alarm report of abnormal data. If data is to be entered by hand, you can generate worksheets for it to be penciled in as it's recorded.

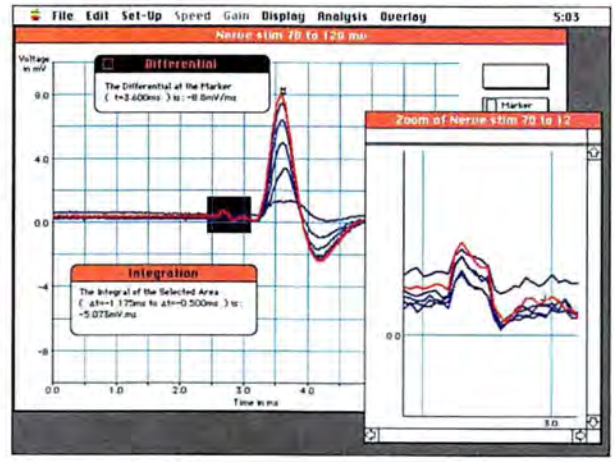
Charts and graphs form a Results Document, which holds a stack of up to 32,767 "slides," as the graphics are called. A list of slides is generated to enable you to change the order of the slides, simply by cutting and pasting the slide titles. You can then use the Mac to put on a presentation of your results. You can also save graphics in the PICT format used by MacDraw.

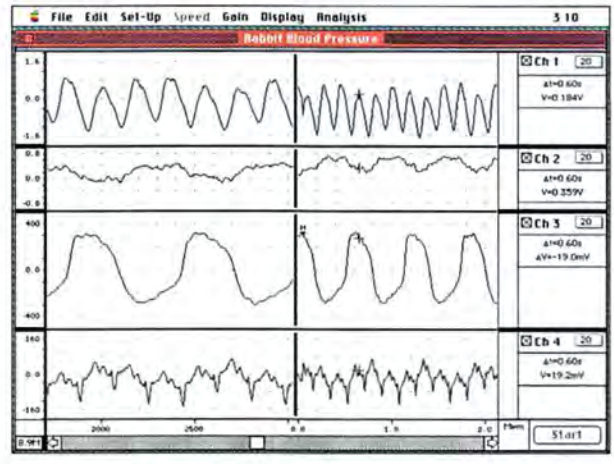
It's tempting to compare Parameter Manager Plus with statistics programs such as StatView II, but because pmPLUS is so closely geared to data acquisition, it stands in a class by itself. Graphing and calculating are speedy, but beginners may find this program a bit complex to learn.

MAC-OSCILLOSCOPES

Another class of data-acquisition software puts oscilloscope functions on a Mac. Scopes are primarily for monitoring data in real time, usually in wave form. To be sure, a Mac Plus with a scope emulator makes an inexpensive oscilloscope. Although "Macscope" setups have sampling rates that are too low for many electronics tasks, they are useful for electrophysiology, medical school labs, chemistry, and life sciences in general. And you can do word processing on the same machine — something not possible with most scopes. We looked at three packages, all of which require their own cards or boxes.

MacLab by World Precision Instruments is a good example of how to turn a Mac into a scope. MacLab started as a teaching tool in physiology classes, but its usefulness in data acquisition allowed it to spread to other applications. Users in biology labs appreciate MacLab's external hardware because it contains high-gain amplifiers, which means that biological signals can be input directly, without the need for preamps.





MacLab's oscilloscope emulator (above) and four-channel chart recorder (below) have similar features: the "M" marker can be moved around to display the slope at any point on the curve. A highlighted area can be integrated and enlarged for detailed study. The coordinates of the "plus" cursor are displayed below. The relative size of each chart channel can be changed in the same way that you can divide a window in Microsoft Excel or Word.

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Data-Acquisition Software

Application Generators



Analog Connection Workbench 3.0 ★★★★½

Required Hardware:
Strawberry Tree.

Icon-based application generator. General-purpose data acquisition, some control and analysis functions. Users create a flow diagram to create applications.
Price: $995



LabTech Notebook 1.0 ★★½

Required Hardware:
GW Instruments, Data Translation, or National Instruments (IOTech scheduled for April release).

General-purpose data acquisition, ported from popular DOS program. Some control and analysis.
Price: $995



LabVIEW 2.0 ★★★★★

Required Hardware:
National Instruments or GW Instruments.

Graphic programming environment for creating applications including functioning on-screen control panel. Can emulate test instruments on a Mac. General-purpose IEEE-488 GPIB and other data acquisition and control, data analysis including complex math, and signal processing.
Price: $1,995

Oscilloscope emulators



MacInstruments 1.04 ★★★½

Required Hardware:
GW Instruments.

Oscilloscope, strip-chart recorder, and scan-line recorder functions. Records up to 833,000 samples/second. Offers wide choice of hardware.
Price: $790



MacLab 2.5 ★★★★

Required Hardware:
Bundled with hardware.

Oscilloscope and chart recorder functions. Records 40,000 samples/second to 12 samples/hour. Nice analysis and interface features. Built-in amplifiers.
Price: $2,925 (includes hardware); optional differential amplifiers, $1,125.



Pacq Manager 1.05e ★★★

Required Hardware:
Bundled with hardware.

Oscilloscope and chart recorder functions. Records 10,000 samples/second to 2 samples/hour. (Version 2.0 to boost maximum rate to 30,000 samples/second, due in August. NuBus board for the Mac II due in August will boost rate to 40 million Hz).
Price: $995; optional external amplifiers, $295.

Analysis



Parameter Manager Plus 3.0 ★★★★

Required Hardware:
None, but works with GW Instruments, Strawberry Tree, IOtech, Data Translation, Rebus RS-232, and others.

Statistical analysis and presentation using spreadsheetlike database in real time, or with imported or hand-entered data. Includes features for statistical quality control, equation fitting, predictive maintenance, histograms, drawing, and presentation.
Price: $395; with communications module, $595.



MacLab's two eight-color applications, called Scope and Chart, enable you to enter data at 40,000 samples per second (this is scheduled to be upgraded to 80,000 by June). Scope, also scheduled to have two channels by June, is chock-full of handy features. Although the smallest tick mark (or division) on the time axis is 500 microseconds, you can blow up a view of a small portion of a graph, so that a 500-microsecond sample fills the entire screen.

A cursor that runs along the waveform tells you the coordinates of any point on the trace. Another marker gives you the slope at any point (the derivative), and you can highlight any portion of the curve to get the area under the curve (the integral). Chart can display four channels of data onscreen simultaneously, and the June upgrade increases that to eight channels. You can change the size of each graph with the cursor.

The MacLab package has a built-in waveform generator, which can be used as a stimulus for electrophysiology tasks. MacLab also provides an analog output to control peripheral devices, and data can be exported to a spreadsheet.

An optional Neurophysiology Package can do real-time histograms. Programmers write applications or access sampling and hardware control routines with precompiled MPW Pascal modules. Another package lets programmers write routines to the hardware's 65C02 assembler.

MacPacq by BioPac Systems is another real-time oscilloscope, chart recorder, and waveform generator bundled with hardware. Pulses as short as one microsecond can be generated. MacPacq records from 2 samples per hour to 30,000 samples per second — up to 65,000 data points in one file. MacPacq continuously logs data onto a disk (in 64K files) until you run out of disk space. You can also print continuously to a laser printer.

The hardware has eight programmable digital I/O lines, macros, and optional ($95) language interfaces that enable you to write hardware-control functions in Pascal, C, BASIC, and HyperTalk (called HyperPacq). Like the MacLab package, MacPacq has optional ($295) signal-conditioning modules for the monitoring of biological signals.

I found the MacPacq software, called PacqManager, slightly less intuitive and Mac-like than MacLab because, instead of changing things directly on the display, you must use the entry windows. I had a problem with the MacPacq hardware, which can run on an internal rechargeable battery. The first unit I had could not hold a charge. A battery-powered unit seems odd, especially since it is used with a Mac, which must be near an AC power

Glossary

analog data — Information in the form of a signal that can take on any value.

digital data — Information in the form of a signal that can have only two values, representing 1 or 0.

GPIB — Acronym for general-purpose interface bus, an industry standard (IEEE-488) for data acquisition that defines the instrumentation/computer interface.

oscilloscope — A device that displays a voltage-versus-time waveform signal, usually of a very short duration. Oscilloscopes can also perform a certain amount of signal processing.

process control — The act of feeding back signals to the device from which they originated or to other devices in response to a measured condition.

scan-line chart recorder — A recorder that writes over a recorded line when it gets to the end of the screen.

shift register — A type of loop that makes output values from previous iterations available as input values.

transducer — Any device that converts physical phenomena into electrical signals.

virtual instrument — National Instrument's term for software emulation of test instruments, including their function, data display, and control panel.

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outlet. However, BioPac is coming out with a new board for the Mac II line, called NuScope, which is scheduled for August release.

Finally, GW Instruments has an oscilloscope package called MacInstruments, which comes with functions for an oscilloscope, strip-chart recorder, and scan-line recorder (a device that draws a trace over itself when it reaches the end of the screen). There is also a "nonstrip" chart recorder, which is similar to the oscilloscope except that it plots points as they come in. The oscilloscope waits for the entire waveform trace to be digitized. The nonstrip scrolling-chart recorder samples at a lower rate than the other three modes and scrolls the display instead of stopping when the right side of the display is reached.

MacInstruments has four input channels — half as many as the other two packages — but the software can be used with most of GW's hardware line (external and internal) for the SE and NuBus. The internal line can be used with MacInstruments to output waveforms.

MacInstruments can digitize data up to 833 kilohertz in its oscilloscope mode for a single channel (100 kilohertz with four channels), 25 kilohertz in its chart-recorder mode, 16 kilohertz in its scan-line recorder mode, and 60 hertz in its scrolling-strip-chart mode. The resolution is impressive — from 1 microsecond to 50 seconds per division. Voltage can vary from 50 millivolts to 10 volts per division.

MacInstruments doesn't have the versatile analysis features of MacLab, but it does automatically calculate standard statistical parameters: minimum, maximum, mean, standard deviation, root mean square, and the area under the wave. Learning to use MacInstruments is fairly easy, and the manuals are generally well written and illustrated, although the lack of indexes can be frustrating.

DATA DECISIONS

LabVIEW is the leader of data-acquisition software, probably the most powerful product for data acquisition, analysis, and control on any microcomputer. It is an excellent tool for an organization doing a variety of tasks. Analog Connection Workbench is not as powerful but is sometimes a better choice for some people, just as a personal computer is a better choice than a VAX. It's much easier to learn and use and is powerful enough for many applications. LabTech Notebook, on the other hand, is definitely a poorer cousin to these two, wanting in versatility, power, and ease of use.

The Mac oscilloscopes are more limited in function but are much less expensive than the application generators. MacLab's analysis features, user interface, and use of color give it an edge over the other Mac oscilloscopes. You could probably develop a MacLab-like application in LabVIEW, but there's no point in spending the time and money if all you require are oscilloscope and chart-recorder functions.

Finally, Parameter Manager Plus can be useful with any of these programs or by itself. It is far more specialized for data-acquisition tasks than any spreadsheet program but is also more complex.

These are only the more mainstream products: there are many data-acquisition and analysis programs for niche applications such as chromatography and sound analysis. In addition, many hardware manufacturers have interface software for their boards. Applying any of these software packages to lab problems can reduce the training time and number of test instruments required, while improving comprehension of results. Labs now using Macs only to present their results would do well to consider applying them to the collecting end as well.

JOHN RIZZO IS THE TECHNICAL EDITOR OF MACUSER. HE FORMERLY ACQUIRED DATA FOR BOEING AEROSPACE AS AN ENGINEER IN THE ELECTRONICS SUPPORT DIVISION.

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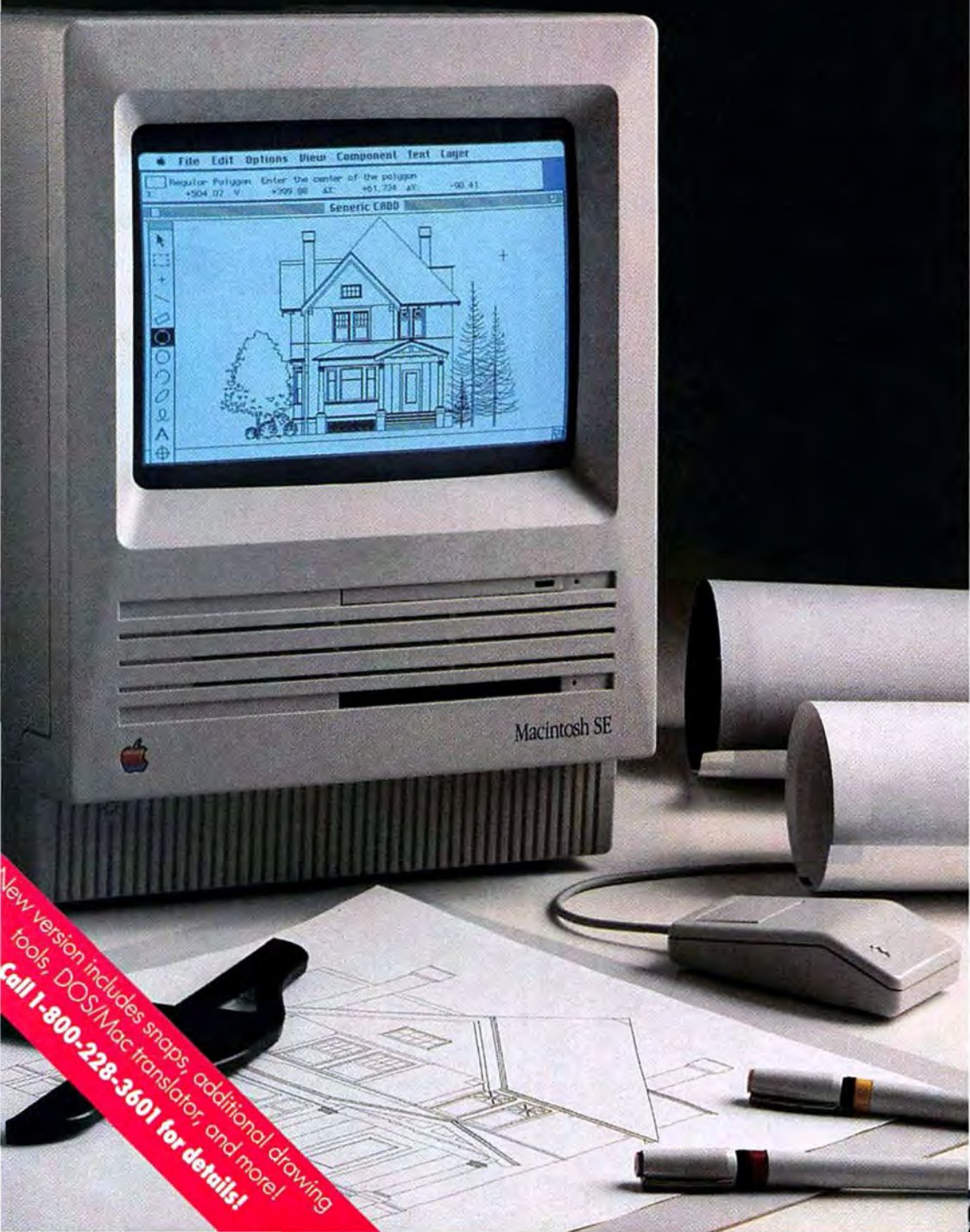
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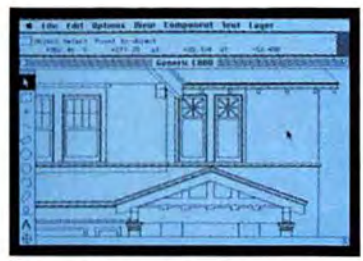
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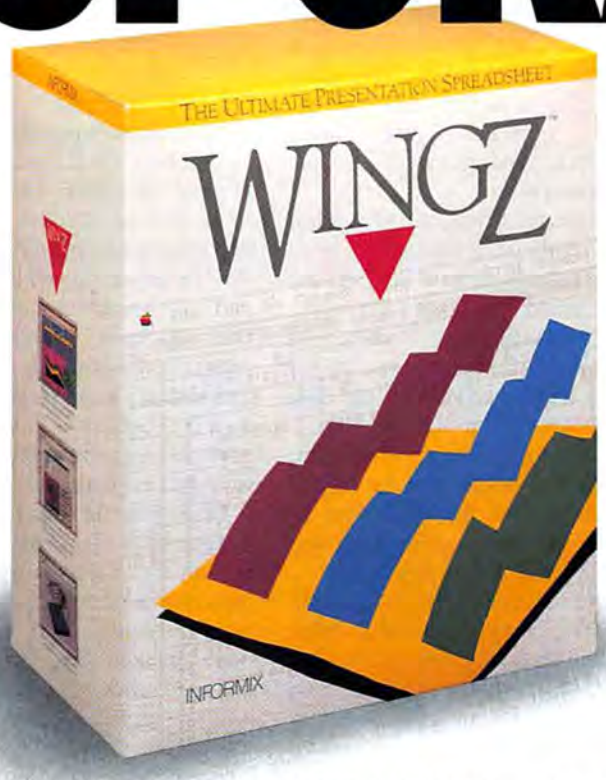
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Hard-Disk Backup: Moving and Storing

With the right software and simple strategies, you can keep your hard disk backed up to floppies without spending a lifetime performing the task.

By James Finn

"The evening, I remember, was one of perfect tranquillity, featuring a sort of serene peace. Which just shows you." — P.G. Wodehouse, *The Code of the Woosters*

Clank, gouge, grind, silence. That was the sound of a hard-disk head crash. All the more impressive because it is rarely heard. But you're not enjoying the novelty of these sounds; you can't enjoy them, because you're beginning to feel unwell. Now the disk drive is smoking. You pull the plug.

The realization has dawned that you've just lost some, maybe all, of your precious data. Forever. And all because you haven't been making regular backups. How can this be?

In a word, floppies. Dedicated backup hardware, from tape to removable hard cartridge drives, typically starts at over $1,000, and you're not ready yet to commit that money to backups. This leaves floppies, and deep in your heart lurks the apprehension that keeping an 80-megabyte hard disk regularly backed up to floppies will require more time and effort than you, a fun-loving mortal, are prepared to invest.

The truth is a good deal brighter. With appropriate software and just a little organization, you can protect yourself while investing only a few minutes a day. I'll discuss some workable backup strategies and take a look at the current crop of backup software. I'll identify features that help speed backups and simplify your life.

GETTING STARTED

With all backup software, you begin by creating a full backup of all or part of your hard disk. This process, naturally, can be a royal pain, requiring precious time and many floppy disks. You've looked down that road before and have always turned back, daunted. Did you know, though, that several programs let you quit during a backup and resume later, so you don't have to do a full backup all at once? This is a particularly civilized feature, and one I wouldn't be without.

Once you have a full backup, you update it as frequently as you like (I recommend daily backups) by making incremental backups, which typically save only files that haven't already been backed up, namely, new or changed files. Incremental backups don't generally take very long, and the more frequently you do them, the faster they go.

MAKING DISTINCTIONS

The handling of incremental backups divides backup software into two categories, which, for lack of any standard terminology, I'll call *archival* and *imaging*. And as long as I'm introducing terms, I'll use *backup set* to denote a set of backup disks.

Archival software works by adding each new incremental backup to the

RON CHAN



others, increasing the total number of disks in your backup set. Nothing ever gets deleted; if you edit one file every day and back it up every day, that's one more copy for your daily backup set.

With imaging software, the backup set always contains an exact copy (or image) of your hard disk. When a file is changed, the old version is deleted from the backup set during incremental backup and replaced by the new version. When you delete a file from your hard disk, the copy on the backup set will also be deleted.

SuperMac Software's DiskFit and Microseeds' Redux (see Quick Clicks in this issue) are the only two imaging programs. Both work by instructing you to insert specific disks from the backup set. You might first be asked to insert disk 7, then disk 12, and so on.

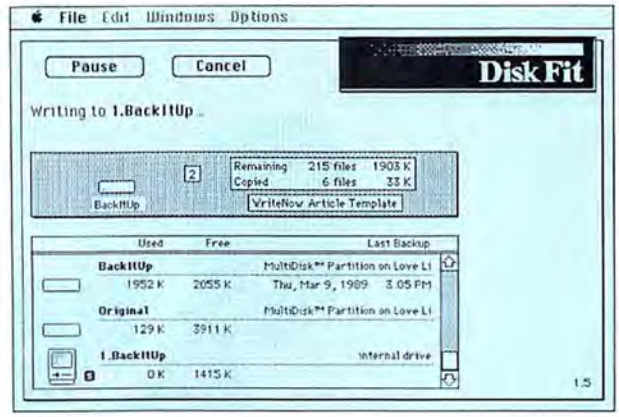


Figure 1: DiskFit is a true imaging program — it makes an exact copy (or image) of a hard disk. You can see how many files have been backed up, how many remain, and which file is currently being copied. It is even smart enough to remember which disks in a backup set contain the files that have changed since the last backup and ask for them by number.

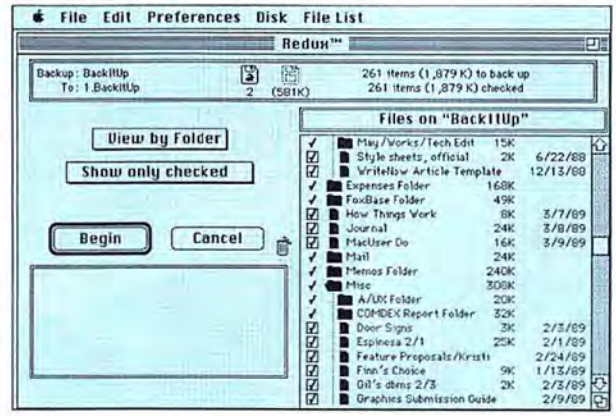


Figure 2: Redux, another true imaging program, offers the most sophisticated interface for selecting files to back up. Clicking on the View by Folder button brings up a window that lets you sort the display by folder (hierarchically), filename, size, or date modified. Similarly, clicking on Show Only Checked pops up a window that lets you control the display.

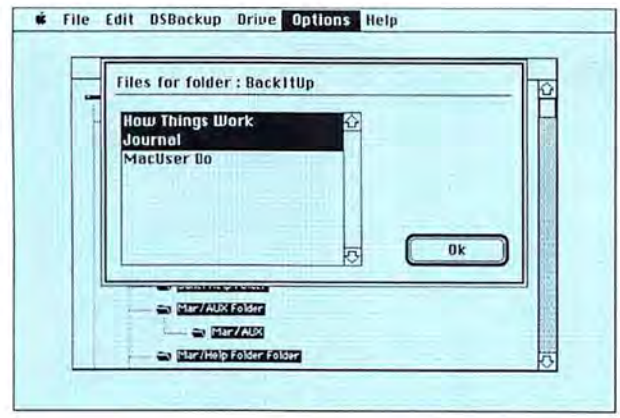


Figure 3: File selection in DS Backup and PC Backup (variants of the same program) is an awkward affair. I want to choose the two files How Things Work and Journal on the volume BackItUp. Selecting the volume BackItUp automatically selects every folder on the volume. However, each folder will be deselected manually after you click on OK.

ARCHIVING VERSUS IMAGING

Archival software has the advantage of added security. Since you retain multiple copies of a file, you can locate and restore an older version if you discover that a file has become corrupted or if you just don't like recent changes you've made. This security, however, has a steep price. The size of a backup set grows with each incremental backup. The only way to reduce the number of disks is to perform a new full backup, a task you'd like to avoid as much as possible.

With imaging software, the size of the backup set grows only when the utilization of your hard disk increases — no need to perform another full backup. This is a tremendous advantage in convenience and is why I prefer imaging to archival software. The price you pay is somewhat reduced security. If you keep only one backup set, you have only one backup copy of each file. If you accidentally delete 20 pages of your novel and then perform a backup, the last good copy of your manuscript will be replaced by the damaged copy.

The solution is to keep two backup sets. Back up to one of them for a few days and then switch to the other. After a few more days, switch back. That way, if you discover you've backed up a corrupted file, you can restore an uncorrupted version from the alternate set.

There are other reasons why keeping two backup sets makes sense. If a disk on one set goes bad, you still have another backup copy. You can store one backup set at a different physical location; a backup is worthless if it's stolen or burned with your hard disk. If you feel particularly paranoid or organized, create a third backup set and update it every six months or so. That way you always have an older snapshot of your disk in case you want an old or deleted file.

It is a good idea to keep at least two backup sets, even if you use archival software. Some archival programs, however, do not support multiple incremental backup sets.

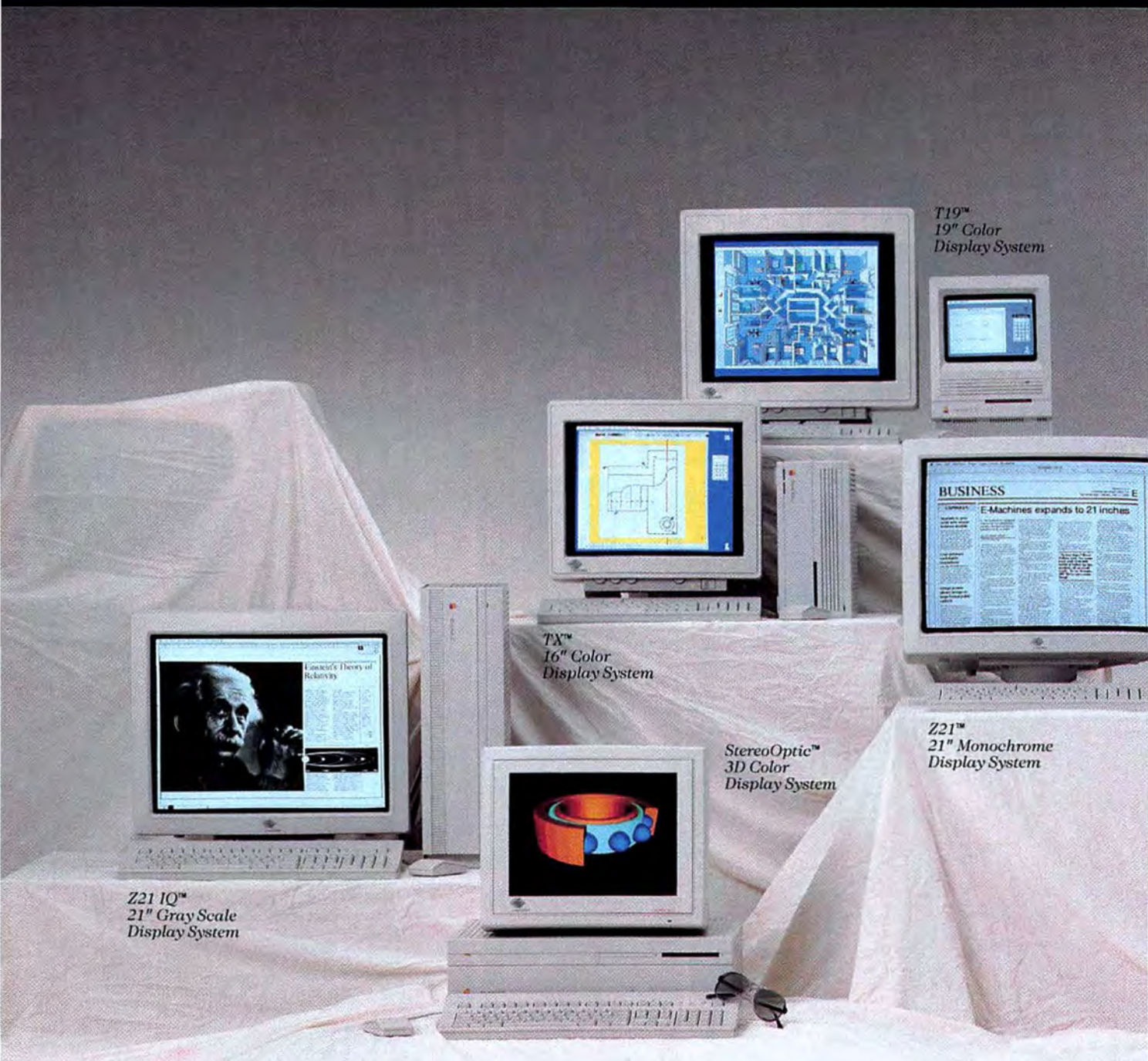
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Table 1: Backup Features

	 **Archive/Restore 1.1.1** Software Architects	 **BRUtility 2.91** Millenium Computer Corp.	 **DiskFit 1.5** SuperMac Software	 **DS Backup 4.2** Design Software	 **Fastback 1.3** Fifth Generation Systems
Retail price	$50	$59.95	$99.95	$69.95	$99.95
Minimum hardware	512K	512KE	512KE	512K	512K
Minimum System	4.1	use current[1]	4.1	4.1	4.1
Type of backup program	archival	archival	imaging	archival	archival
Can quit and resume backup	yes	yes	yes	no	with difficulty[2]
Supports multiple backup sets	yes	yes	yes	no	no
Can back up documents only	yes	no	yes	yes	yes
Can select files to back up	yes	yes	limited	yes	yes
Can remember selection criteria	partial	no	NA	no	no
Can back up by date file modified	yes	no	NA	no	yes
Copies in Finder format	yes	yes	yes	no	no
Can verify writes	no	always[3]	yes	yes[4]	yes
Easy to find files on selective restore	no	with report	with report	yes	yes
Easy to find most recent version of file	no	no	NA	no	yes
Has report facility	no	yes	yes	yes	no
Runs in background under MultiFinder	no	no	yes	yes	no
Supports FDHD floppy drive	yes*	yes	yes	yes	no
Supports Apple's Tape Drive 40SC	with driver	with driver	yes	yes	yes
Supports hard cartridge drives	yes	yes	yes	yes	no
Can schedule unattended backup	yes	no	yes	no	no

*Erase Media option doesn't work. [1] Use current System recommended by Apple for your hardware. [3]Partial verify only. [4]Verification by checksum.

Features I consider important include the ability to quit during a full backup and continue later, backup of documents only, verification of writes, and support for multiple incremental backup sets. The entry *NA* means a feature is not applicable to the product.

I've also included information for larger-capacity backup media. For Apple's Tape Drive 40SC, the entry *with driver* means you need a commercial driver that can mount the tape drive as a volume on the desktop. Support for hard cartridge drives generally depends on the driver's identifying the media as ejectable.

The other useful features are a matter of personal choice.

You can save time and space by backing up just some of the files on your hard disk. You might prefer making backups of just your documents; after all, you have the master disks for your applications. Most programs let you back up documents only — another feature I wouldn't be without.

Several programs let you select exactly which files you want backed up, so you can create a backup set containing (or excluding) related files and folders. The usefulness of this feature depends a lot on how it's implemented.

Once you've created a backup set with selected files on it, you presumably will want to perform incremental backups of the same files. Surprisingly, some programs provide no way to record your selection; you have to reselect all the files manually to make an incremental backup. How selections are recorded also affects convenience; only Redux automatically stores the selection information with the backup set.

All the programs split a file if it is too large to fit on a single floppy. Some programs copy files in "Finder format," meaning that each file can be opened directly from its backup disk. Other programs use a proprietary format, so you must restore a file before it can be opened.

Many programs offer the option to verify writes during a backup, which means that each time the program writes a block of data to a floppy, it immediately reads it back and compares it to the block it wrote to check that they match. This option increases backup time but guarantees that all data is written correctly. Fifth Generation Systems' Fastback adds an error-correction scheme, increasing reliability during file restoration.

Restoring files should be simple. If you must retrieve a single file, will the program tell you which disk it's on, or will you have to hunt for it? If you use an archival program, you may have several versions of the file. Will the program easily locate the most recent version?

Can the program generate a written report? I'm not convinced of the wisdom of doing backups while running other Mac applications, but I have indicated whether each program can run in the background under MultiFinder. I've noted which programs support the 1.4-megabyte FDHD floppy drive in Apple's newest Macs. Consult Table 1 for further comparisons.

A SPEEDY STRATEGY

With incremental backups, the big-

	 **HDBackup 1.1** Apple Computer	 **HDBackup 2.0** PBI Software	 **HFS Backup 3.0** Personal Computer Peripherals Corp.	 **PC Tools Deluxe 1.0** Central Point Software	 **Redux 1.01, 1.5** Microseeds Publishing	 **Retrospect 1.0B2** Dantz Development Corp.
	free	$49.95	$99	$79	$99	$249
	128K	128K	512KE	512K	Plus	Plus
	4.1	4.1	4.1	4.1	4.1	4.2
	archival	archival	archival††	archival	imaging	archival
	no	no	no	no	yes	yes
	no	no	yes	no	yes	yes
	no	no	yes	yes	yes	yes
	no	limited**	yes	yes	yes	yes
	NA	no	yes	no	yes	yes
	no	no	yes	no	yes	yes
	yes	yes	optional	no	no	no
	no	no	yes	yes	yes	yes
	no	no	yes	yes	yes	yes
	no	no	yes	no	NA	yes
	no	no	yes	yes	yes	yes
	no	no	no	yes	yes	yes
	yes	yes	yes§§	yes	yes	yes
	no	no	with driver	yes	with driver	yes
	no	no	no	yes	yes	yes
	no	no	yes	no	no	yes

◊Via Rebuild Catalog feature. **Single file or folder only. ††Partial imaging capability. §§Disks must be preformatted.

gest and most frequent bottleneck can be the time required to scan the directory of your hard disk. When you have many files on the disk, scanning the directory can take as long as copying files that have changed.

One way around this obstacle is to partition your hard disk. Partitioning software divides the disk into separate volumes, each of which can be mounted on the desktop and backed up independently. With a partitioned hard disk, backups are more efficient and painless. For example, I keep a small partition that contains only 2 megabytes of my newest documents, and I have a larger partition for older documents. I back up the "new files" partition every day. Since it is small, the directory scanning time is very fast, and the entire backup set contains only a few disks. When that partition starts to fill, which happens every month or two, I move older files to the larger partition, which I back up separately.

As for partitioning software, I'm partial to ALSoft's MultiDisk (see Quick Clicks, May '89), but several other partitioning programs are available commercially.

NAMING NAMES

Fastback is the fastest backup program for full backups (see Table 2). It lacks the features of some of the other programs, but a new version was in beta at press time and should now be available. Among other features, the new version supports more backup devices, data compression, and automated backups.

DiskFit and Redux are the only two true imaging programs, though Redux gives you much better control over what gets backed up. Within DiskFit, you can't select either a set of files or folders for a backup set. You can prevent a folder from being backed up only by renaming it to begin with an open square bracket ([) and to end with a closed square bracket (]), a very awkward arrangement.

Redux, on the other hand, lets you select exactly what you want to back up from within the program, and it is easy to choose files based on filename, type, or date of modification. You can also see which files have changed before you begin a backup. Redux 1.5 offers more features than the older version (1.01): you can temporarily postpone backing up any file and even see which files have been deleted from your hard disk since the last backup. But I've had problems with this new version — it hangs sometimes during backup, forcing me to reboot my machine, and it occasionally skips a file during a restore. I've gone back to us-

ing version 1.01, which is solid. Right now, Redux 1.01 is my backup program of choice. When Microseeds fixes the bugs, that honor will likely go to the new version.

PCPC's HFS Backup is an excellent archival program with a rich set of features, including a virus checker and partial imaging capabilities.

Apple's HDBackup and PBI's HDBackup are similar programs; Apple licensed the program from PBI, and the two versions differ somewhat. But I can't recommend either version, even though Apple's is free. They're the slowest programs tested and the most featureless. Worse, both define an incremental backup to be everything that has changed since the last full backup, so each incremental backup takes longer than the last one until you cave in and do another full backup.

Design Software's DS Backup and Central Point Software's PC Backup (included in PC Tools Deluxe) are also

Table 2: Backup Times (in minutes & seconds)

	Full backup	Large incremental 800K	Small incremental 35K	Successful restore
Fastback	4:18	1:12	0:27	yes
DS Backup	5:38	1:12	0:18	yes
PC Backup	5:42	1:13	0:19	yes
HFS Backup	6:24	1:26	0:37	yes
Archive/Restore	6:32	1:01	0:10	yes*
DiskFit	6:45	1:37	0:37	yes
Redux 1.01	7:07	1:46	0:37	yes
BRUtility	7:11	1:16	0:19	no†
Retrospect (beta)	7:47	1:38	0:30	yes
Redux 1.5	8:16	2:10	0:50	yes
HDBackup (PBI)	11:50	2:04	2:03	yes
HDBackup (Apple)	12:29	2:02	2:04	yes

Sorted by full backup time.
*Had to rebuild desktop on backup disk. †Program crashed on restore.

Each backup program was tested for speed. The tests were performed on a 5-megabyte Mac II with a single 800K floppy drive, a Maxcess 150-megabyte external hard disk, Finder 6.1, and System 6.0.3. I created an 8-megabyte partition on which I placed 5 megabytes of files, some of which were large and had to be split during backup. I timed a full backup and then two incremental backups. The first incremental backup involved 800K of changed files. For the second, only four files totaling 35K had changed.

In all tests, I inserted floppies as quickly as they were requested. The Control Panel's RAM cache was turned off unless a program's manual recommended using it. All user-adjustable software options were set for maximum speed. No INITs were running except MultiDisk, the partitioning software. After the backup test, I restored a few files to verify that restoring was possible. BRUtility was the only program that did not restore, although I had to rebuild the desktop on a backup disk before Archive/Restore would successfully restore a large file that had been split on backup.

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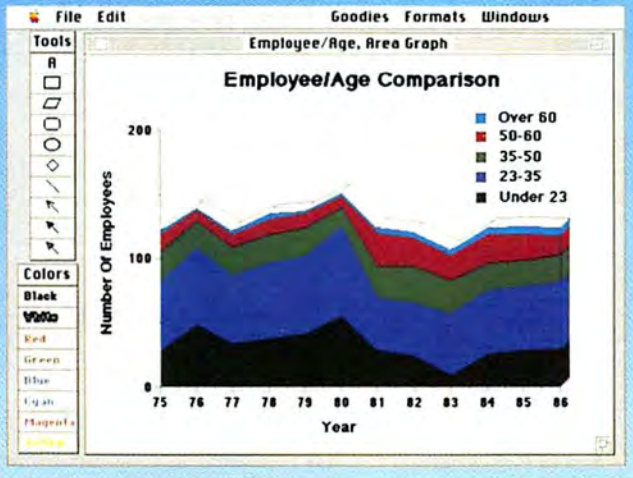
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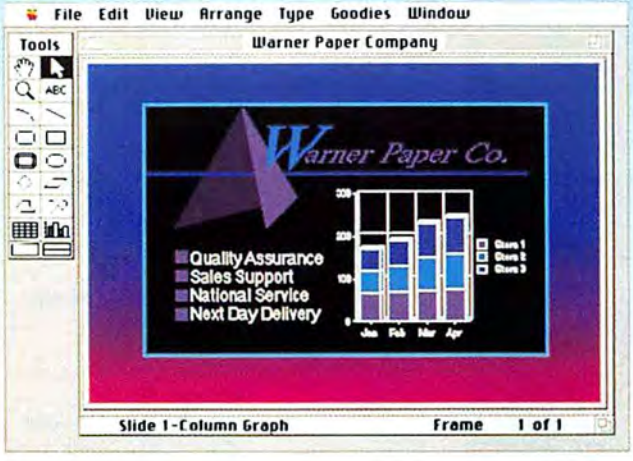
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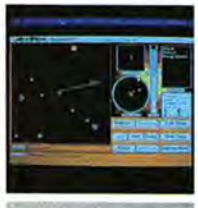
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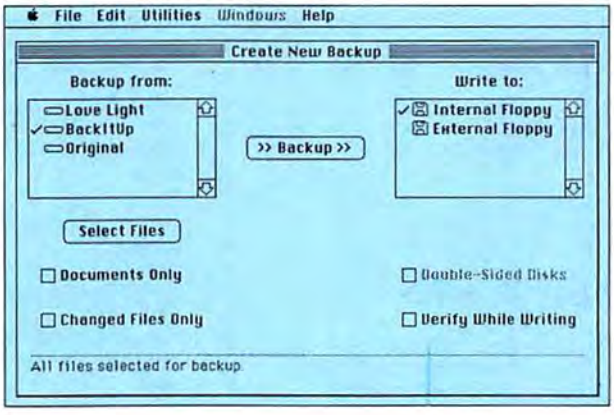


Figure 4: Fastback 1.3 doesn't have a lot of features; all options are visible in this window. But it's the fastest program tested. Clicking on the Select Files button produces windows in which you can select individual folders and files for backup.

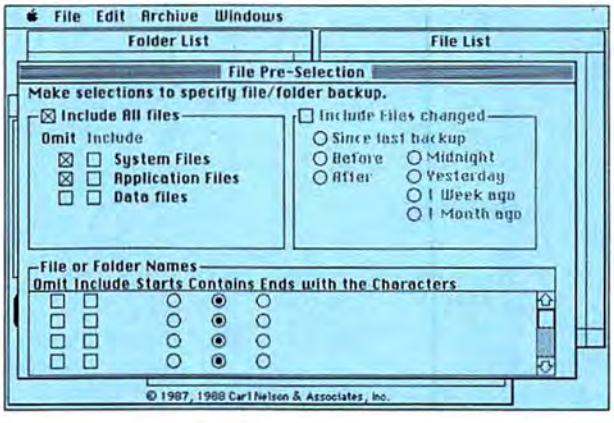


Figure 5: Archive/Restore's File Pre-Selection window lets you select files for backup, using a variety of criteria, and these preferences can be saved. Hidden in the background are the Folder and File List windows, which let you select any individual folders and files. Your choices, however, cannot be saved.

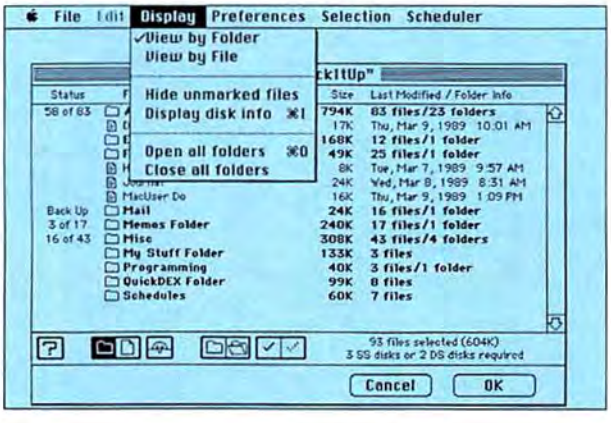


Figure 6: HFS Backup uses this window to select individual files and folders. The icon bar at the bottom is for selecting files and folders and opening or closing individual folders. It also duplicates some of the functions of the Display menu.

variants of the same program; Central Point Software licensed the code from Design Software. These programs are second only to Fastback in raw speed, but they lack important features such as support for multiple incremental backup sets. Although you can select files to be backed up, the interface is clumsy (see Figure 3). One warning: Design Software sent me a disk that was infected with the nVIR virus! The company sent me a clean copy once I reported it, but I advise caution if you buy its software.

Millennium Computer Corp.'s BRUtility 2.9 bombed when I tried to restore a large file that had been split on a backup. Millennium promptly sent me version 2.91, claiming it had fixed the problem. But 2.91 still crashed on restore.

Software Architects' Archive/Restore divides backing up and restoration into separate programs. Restoring

is very awkward. You have to insert every disk in the backup set twice; first to be scanned, and again for the restore. Worse, the Restore program cannot restore large files that have been split. To do so, you have to use the Archive program. Huh?

Retrospect is the new archiving program from Dantz Development Corp. By *archiving*, Dantz means moving files off your hard disk, which you do by deleting files as they are backed up. Retrospect is a full-featured archival-style backup program that supports a wide variety of backup media. Backups and restores can be performed with almost any selection criteria imaginable. I worked with a beta version of the program, so don't take the timing tests seriously. I'm not yet convinced that Retrospect has enough additional features to justify its hefty $249 price.

Redux and DiskFit are both excellent imaging programs, although Redux's numerous features give it an edge. For archival backups, Fastback is the speediest; for additional features, look at HFS Backup and Retrospect.

One more thing to consider in this process: backup sets use a lot of floppies. Shop around for the best price; I discovered that the same floppy disks priced at $28 for a box of ten are available in bulk for $1.39 each.

Remember, if it's your hard drive, drive safely. Back it up today.

JAMES FINN IS LOOKING FOR BACKUP SOFTWARE AND HARDWARE THAT WILL ENABLE HIM TO FREE UP SOME SPACE IN HIS BRAIN BY ARCHIVING ITS CONTENTS TO SOME OTHER MEDIUM.

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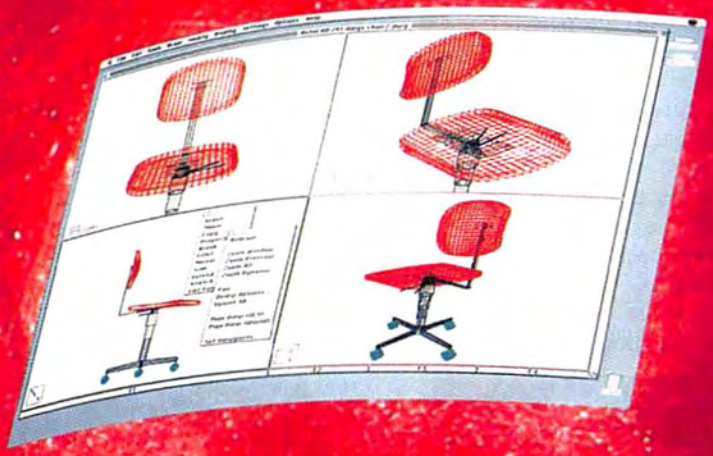
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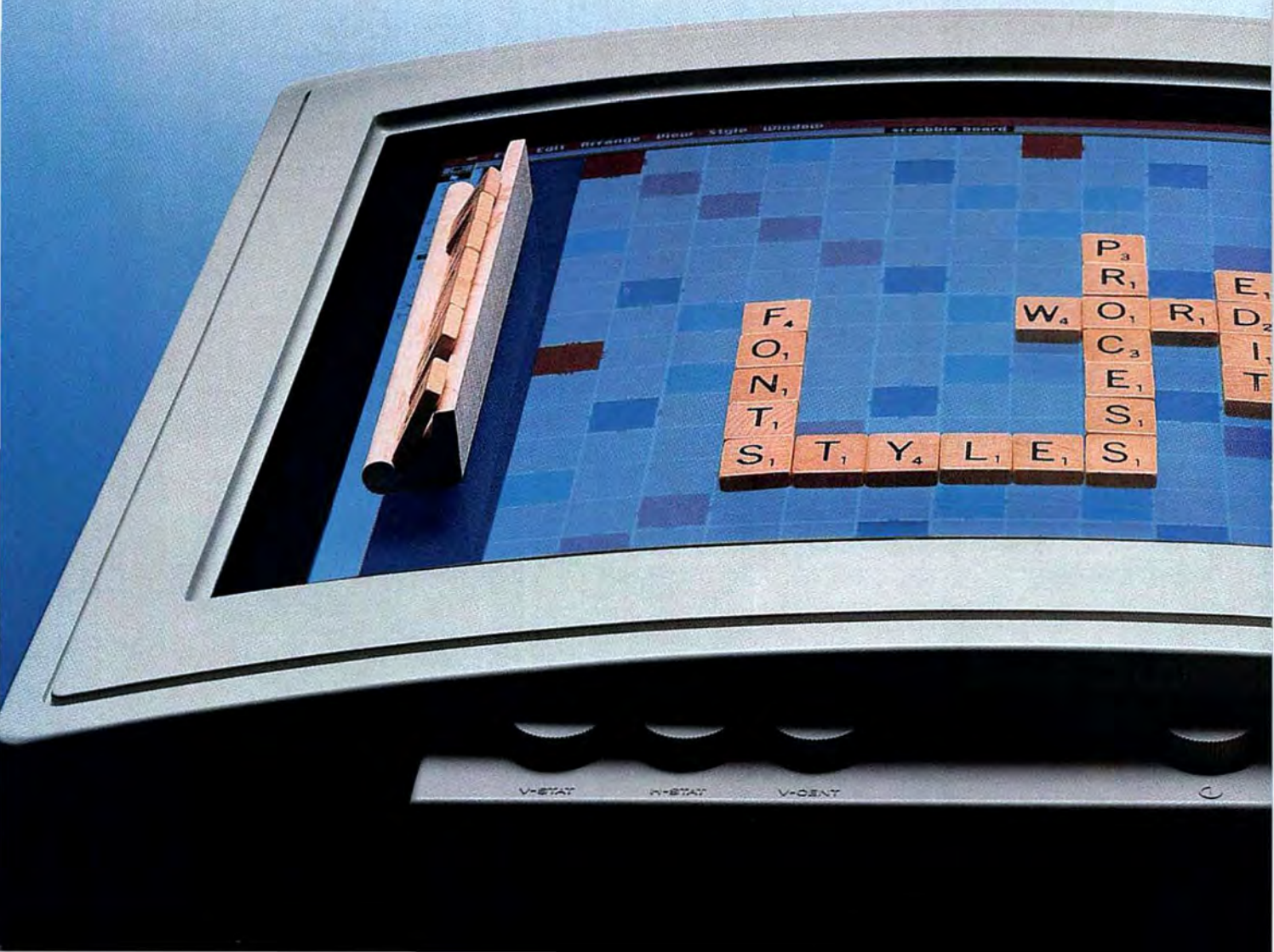
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The War of the

Underdogs may be popular, but what's true in sports, politics, and lawsuits isn't necessarily the case in software. When it comes to picking a program that you're going to have to live — and more importantly, work — with, you have to base your decision on something more than sentiment. With that in mind, this month we present a face-off between the two latest contenders for the heavyweight word-processor crown: Paragon Concepts' Nisus and Microsoft's Word 4.0.

It'd be hard to think of a better example of an underdog than Nisus. A direct descendant of Paragon's earlier text editor, QUED/M, Nisus is a fea-



Words

The battle of the heavyweight word processors has begun anew. Word 4.0 is the latest top contender, but Nisus is mounting a challenge.

ture-packed program from a tiny company that is now in the fight of its life in the arena of power word processors. As you might expect from its heritage, Nisus' strengths are its text-editing capabilities. These, combined with GREP (you'll find out what that is if you read the article), plus a built-in draw environment and powerful indexing features, make it a legitimate contender.

Word 4.0's credentials, on the other hand, immediately push it to the front ranks. After suffering innumerable punishing body blows over the disastrous Word 3.0, Microsoft dragged itself to its feet and went back into training. The result is a package that cures all of Word 3.0's weaknesses and is bulked up with powerful new features such as table creation; hot links to Excel, Microsoft Mail, and SuperPaint 1.1; and fully customizable menus.

So settle back, put your feet up, and join us at ringside as we fill you in on the vital statistics. The heavyweight bout begins when you turn the page.



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Nisus: The Writer's Tool

Nisus, from Paragon Concepts out of QUED/M, takes on the big boys for a share of the high-end word-processing market.

For the first time in a long while, the high-end Macintosh word-processing market — virtually the exclusive property of the powerhouse publishers — is being braved by a small but feisty upstart. Paragon Concepts' new word processor, Nisus (from the Latin *niti*, to strive), is a bid at the high end of the market, currently dominated by Microsoft Word, although FullWrite Professional and — to some degree — WordPerfect have made inroads. But these products have major, multiplatform companies behind them; Nisus is a David to their Goliaths.

Although in its first iteration Nisus has more functionality than applications such as WriteNow (one of the most popular middle-range word processors), it doesn't yet match the rich feature lists of FullWrite, Word, or WordPerfect for the Macintosh. Even so, its unique mix of features — which include powerful editing capabilities, built-in graphics, a find/replace function with sophisticated pattern matching, and automatic indexing functions — may well give even this early version of Nisus a niche. If the folks at Paragon continue the way they've begun, future versions may easily have a shot at the high-end title.

Nisus grew out of Paragon's text and program editor, QUED/M (Quality Editor with Macros), and most of QUED/M's text-processing features carry over to the word processor. (See the review of QUED/M in the March '88 issue of *MacUser*.) This

By Linda Iroff



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genesis explains the presence of features such as Match Parentheses and Auto Indent and also accounts for the program's general emphasis on text editing over formatting. For example, Nisus supports virtually unlimited Undos and multiple Clipboards, pattern matching for search and replace, and macros to aid in editing, but it lacks some formatting features such as footnotes and automatic hyphenation. If you want to edit text quickly and efficiently, Nisus may be for you.

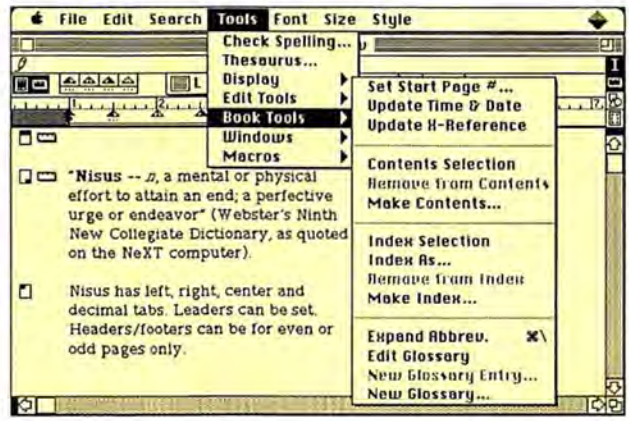


Figure 1: Some of Nisus' hierarchical menus seem overly long, but they are fairly well organized. Any menu or submenu item can be assigned a Command or Command-Option equivalent, but you cannot move or delete commands from menus.

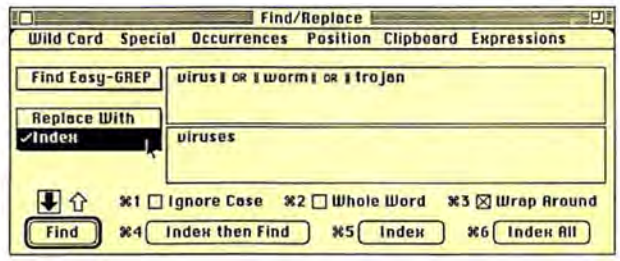


Figure 2: In the Easy-GREP search mode, the Find/Replace dialog box enlarges to include menus with all Easy-GREP commands. Use Index instead of Replace With to index all occurrences of the found text.

WHAT YOU SEE — FIRST

When you open a Nisus document, you see the Info Bar on top. It shows you the cursor position and current page number and tells you if there are unsaved changes. Below that is the Master Ruler, which functions similarly to the ruler in Word. You turn ruler displays on and off by clicking on the top two icons above the vertical scroll bar. You can also turn the display of header/footer and ruler icons in the left margin on and off and split the screen horizontally and vertically.

Although Nisus' screen is not exactly WYSIWYG, it provides more information than WordPerfect or Word 4.0 in Galley View but less than FullWrite's or Word's Page View. Headers/footers and page breaks appear on the screen, but turning off page-break updating speeds up performance. Multiple columns appear only in the Page Preview window.

FILE MANAGEMENT

Nisus can directly open Microsoft Word 3.0x, MacWrite, and text files and can save them as Nisus documents, in stationery (template) or text-only format. Nisus' file type is TEXT; text and formatting are stored in the data and resource forks, respectively. Thus, any application that can open text files can open Nisus documents, but only the manuscript's text is preserved; all formatting is lost. A utility that comes with the program adds a filter to PageMaker so that documents placed in PageMaker maintain formatting. The only other way to export formatted text is through the MacWrite-compatible Clipboard.

One of Nisus' unique and more powerful features is the Catalog, which functions something like a modeless Open dialog box. With it, you can open several files at once; create a list of files to search through or operate a macro on; and switch glossaries, dictionaries, and macro files. It also allows you to search through multiple — open or closed — files.

Nisus backs up the previous version of a document on saving. Automatic saves can occur after a user-specified number of keystrokes. In the Save As dialog box, you can change the name of the current document without saving first. You can also automatically save to a second disk or location.

SUPERB EDITING

As its origins suggest, Nisus is an excellent text-editing tool. You can have up to ten Clipboards open for saving parts of your text, and a virtually unlimited number of Undos. Double-clicking selects a word (as expected), triple-clicking selects a line, and quadruple-clicking selects a paragraph. If you're fast enough, you can even quintuple-click to select the whole document (or just use Command-A). Multiple-click dragging extends the selection by word, line, and so on. You can make rectangular selections for tabular columns and the like by holding the Option key down — even in ordinary (nontabular) text.

Although Nisus has detailed (and long) menus (see Figure 1), you can also move around efficiently from the keyboard. An appendix in the manual lists eight pages of keyboard commands for moving, deleting, managing windows, and performing other functions. Command-key combinations serve to choose options in all dialog boxes. If you forget which key to use, holding down the Command key brings up a list of options — such a useful and intuitive feature that you wonder why no one thought of it before. Unlike FullWrite and Word, Nisus has no way to pull down menus from the keyboard, but, as in Word, Command-key equivalents for frequently used commands are user-definable. (Extended keyboards are not supported in this release but should be in the first upgrade.)

Nisus also includes a wide variety of built-in text styles, including strikethrough, overbar, invisible, condensed, and extended. Boxed text is also a simple style rather than a cryptic code as in Word. You can create your own user styles that are combinations of style, font, and size.

REFERENCE MATERIAL

Glossaries are convenient for frequently used text and graphics, as are Variables for page or line number, date, time, and so on. Nisus also provides a cross-referencing variable, which can combine with Markers (similar to FullWrite's Booknotes) to provide references such as "See discussion on page x." By using a supplied macro to do the numbering, you can create "See Figure x on Page y" references. Unfortunately, implementing this feature is far more confusing and difficult and less powerful than FullWrite's Classifications and Citations, which allows you to number items such as illustrations automatically and refer to them in the text. If the text surrounding a marker is cut and pasted elsewhere, the marker does not move with it, as you might expect.

One of Nisus' most useful features is the indexing function. Creating an index is a simple matter of choosing the word or text to be indexed and choosing Index from the Book Tools menu. The program picks up all occurrences of the indicated material, automatically eliminating duplicate page numbers, and generates a separate index file. Setting up a table of contents is a similar and equally straightforward process.

SUBSTANTIAL SEARCHING

Nisus gets a gold star for its search-and-replace capabilities — another legacy from QUED/M. You can search and replace by font, size, and style, through open and unopened files. All the other usual features are available (including forward, reverse, wrap, whole word, and ignore case). But Nisus has something the other word processors lack: GREP.

Put simply, GREP is to wildcard searching what baking a soufflé is to frying an egg: it's rather more difficult but also more rewarding. Special "metacharacters" represent characters in a set, such as any lowercase letter or any digit. With a combination of metacharacters, you can build a pattern for searching. You can also specify where to search for a pattern — only at the beginning of a line or the end of a paragraph, for example. The GREP commands also allow you to mark index entries wholesale, using Find/Index instead of Find/Replace (see Figure 2). You can even use one GREP command to search for several words (or forms of words) to index under a single entry.



The macro facility gives Nisus its great power — these macros can do everything but make your coffee.

GREP comes from the UNIX world and is correspondingly difficult to use. Fortunately, Paragon has addressed this problem with Easy-GREP, which provides a menu-driven interface to some of GREP's features. It provides a gentle introduction to GREP — as much as most users will need.

FORMATTING

Nisus' rulers offer a combination of Word's power and FullWrite's ease of use. Each paragraph has its own ruler, with the Master Ruler showing the setting of the paragraph where the I-beam is currently located. Ruler icons in the left margin indicate any format change between paragraphs, and these icons can be selected, cut, copied, and pasted. Copying a ruler format from one paragraph to another is as simple and intuitive as copying the ruler icon and pasting it into the target paragraph.

Line and paragraph spacing can be set independently from pop-up menus on the Master Ruler in points, centimeters, inches, or lines. A third menu sets justification. Setting tabs or margins extends a dotted line down the page to help you see how things will line up.

Nisus has no style sheets, but it does have user-definable, character-based styles. For example, if you created a style called Section Head that specified bold, 18-point Times, Section Head would appear in the Style menu. If you changed that style's definition, the text would automatically reflect those changes.

Headers and footers in Nisus are similar to those in FullWrite. New headers/footers can appear on every page; icons in the left margin show their locations. An ancillary ("daughter") menu to the right of the menu bar lets you set options.

Nisus' Page Preview is one of the nicest in the business (see Figure 3). Within it you can set margins visually or numerically, center the margins on the page horizontally and/or vertically or expand them to the printer limits and select single or facing pages. Columns, column rules, and widths are set in Page Preview, as are page frames (boxes that surround each page of text). The preview window can remain open on the screen while you are editing, and the preview quickly reflects any changes.

MACROS

The macro facility combined with GREP and the Catalog is what gives Nisus its great power. You can set a macro loose that goes through a list of files, makes changes or extracts data (using pattern matching), creates new files for extracted data, indexes files, and all but makes your coffee.

Macros, available on the Tools menu or by key command, can be typed in the macro language or recorded as you perform a series of steps. Macros can call other macros — including themselves — prompt for user input, open a desk accessory, and create new macros. They are fully editable.

If you are short of the time or inclination to create your own macros, you can avail yourself of the more than 80 supplied with the program. Among other things, they provide widow/orphan control, convert quotes to smart quotes, convert Microsoft Word table-of-contents and index entries into the Nisus equivalent, number figures, sort by ZIP code, and address envelopes (with included envelope templates).

FINDING THE RIGHT WORD

Nisus includes an 80,000-word dictionary for spell-checking and a

42,000-word thesaurus (see Figure 4). You can add words to the editable user dictionary; a supplied macro lets you add multiple words to the dictionary at one time. In addition to providing an often long list of suggested spellings, including both typographic and phonetic suggestions, Nisus checks for double words, incorrect suffixes and prefixes, and lowercase words after a period. Several foreign-language dictionaries are also available. Thesaurus entries include a brief definition of each group of synonyms, and the last ten words are listed in a pop-up menu for backtracking.

GRAPHIC ILLUSTRATION

You can insert graphics into Nisus documents in two ways: paste them directly into a line of text as a character graphic or create them with the graphic ruler. Character graphics can be resized, cropped, and moved above or below the baseline.

You can also create graphics by using a built-in MacDraw-like environment similar to that in FullWrite (see Figure 5). Rather than requiring you to draw in a separate window and use a layout page for positioning the graphic as a sidebar, Nisus lets you draw directly on the page, as if on a transparent overlay. The drawing environment is not as powerful as FullWrite's — it lacks such features as Bezier curves, Rotate and Flip commands, and exact sizing commands — but it makes placing pictures relative to text quite easy. Each object attaches to the nearest text paragraph and moves with it. You can anchor graphics to a specific place on a page by drawing them before typing any text.

Text can wrap around graphic objects or pass through them. Although Nisus cannot wrap text around an irregularly shaped object, you can produce the same effect by having the text pass through the irregular object while wrapping around invisible boxes you've drawn beneath the object (make sure you do not group the boxes). Objects can be transparent, opaque, or "XORed" (in the latter case, two overlapping blacks make white, creating a reverse image, but the LaserWriter cannot currently print this kind of object).

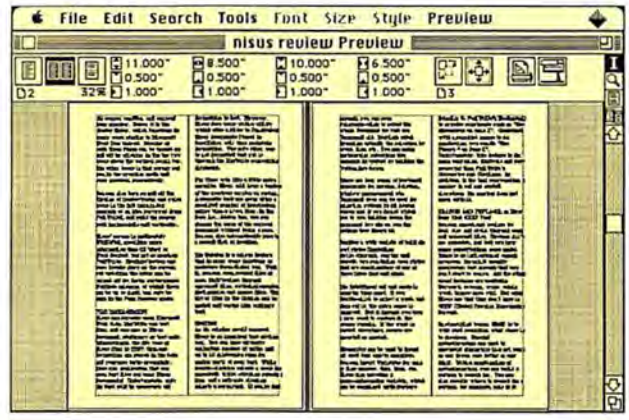


Figure 3: From Nisus' Page Preview, you can set margins, gutters, columns, column rules, and the like. Clicking on the appropriate icon takes you directly to the Page Setup or Print dialog boxes. The Page Preview window can stay open and reflect editing changes as you make them.

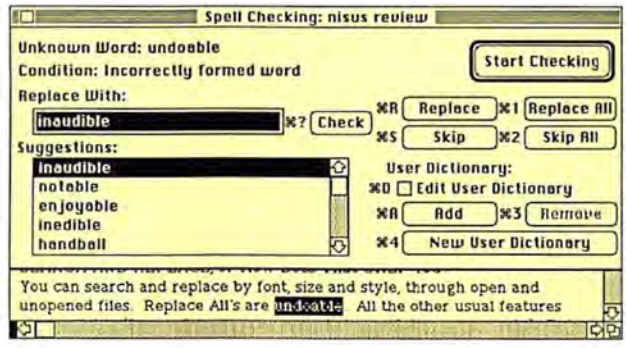


Figure 4: The 80,000-word spelling checker not only finds misspelled words but also flags "incorrectly formed" and double words. Nisus provides a long list of phonetic and typographical suggestions for words it doesn't know. You can add new words to the editable user dictionary.

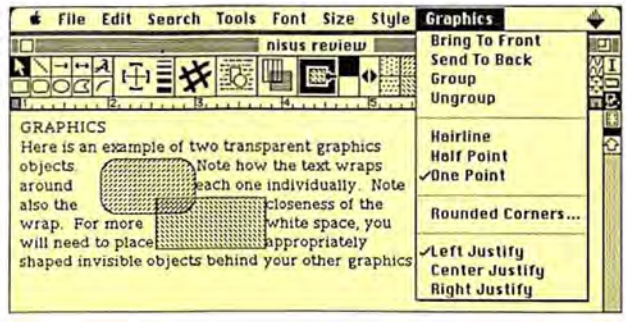


Figure 5: The built-in graphic mode is less powerful than FullWrite Professional's but is more simply integrated into the program. You draw directly on the page, as if on a transparent overlay. Objects are attached to the nearest text paragraph and float with it.

AS YOU LIKE IT

Nisus gives you an extensive set of user-definable preferences. You can specify how often you want automatic backups, the maximum number of Undos (a smaller number frees more memory for your documents), default modes for searching, units of measurement, scrolling speed, dictionary location, and more. Any menu or submenu item can be assigned a Command or Command-Option equivalent. (If the key is already assigned to another command, Nisus simply asks if you want to remove it from that command.) You cannot move or delete commands from menus as you can in Word 4.0, however.

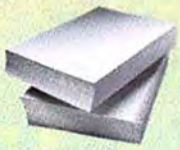
DOCUMENTATION AND SUPPORT

The 350-page manual is well written and organized, with numerous screen dumps and cross-references. A brief tutorial introduces users to the basics. Similar tutorials for EasyGREP, GREP, and macros would also be welcome — although these functions are clearly explained, more examples are needed. On-screen help is minimal and covers only a few topics, but the technical support is excellent. The toll-free support number is (800) 922-2993.

THE NICETIES OF NISUS

Whatever sins Nisus commits are mostly sins of omission. For example,

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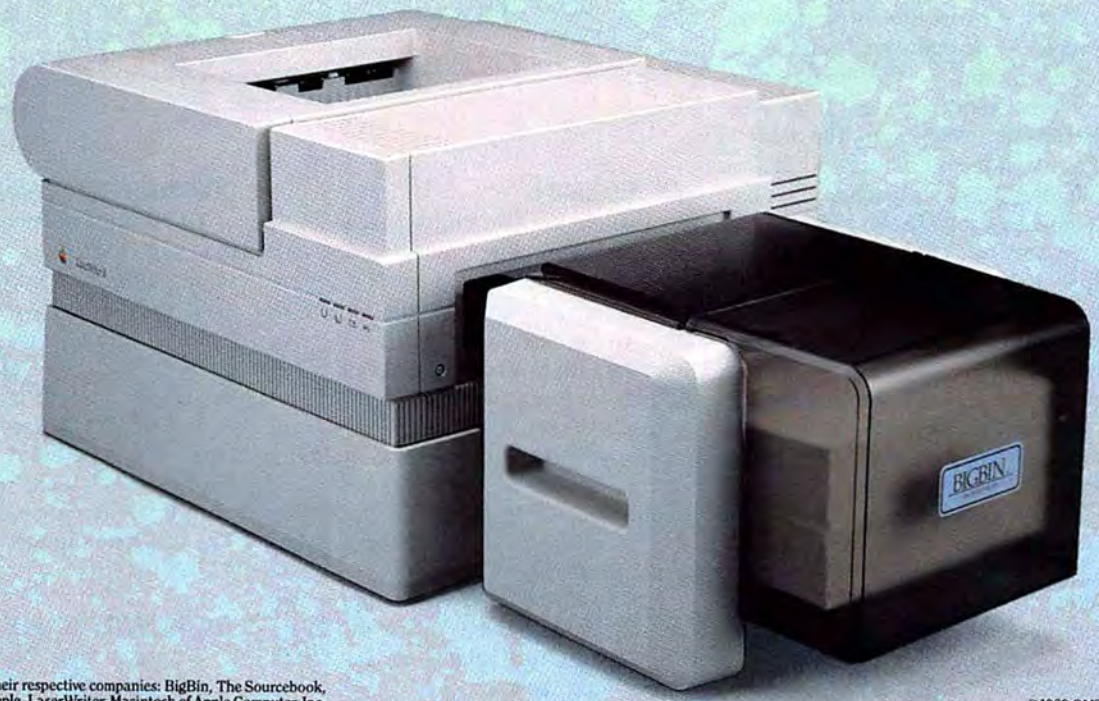
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there are no footnote or endnote capabilities, although they are promised for the next release. There is no outliner or section/chapter organizer such as those of Word and FullWrite. Nisus also lacks the fine typographic control and sidebars of FullWrite and doesn't include hyphenation or kerning functions.

Most of what Nisus does, it does well, however. The program is remarkably stable, especially compared to the first releases of many other word processors; I haven't been able to crash it during several weeks of hard use (and I know how to crash programs). A maintenance upgrade that fixes several obscure bugs is being shipped to registered owners.

Overall, this program has a crisp feel, with prompt screen updating, scrolling, and searching. It runs quite well with 1 megabyte of RAM, but document size is restricted by available memory. (Nisus swaps parts of itself in and out of memory to try to make room for your document.) The program itself is less than 500K, so you'll have room for documents if you're using a dual-floppy system.

Prospective buyers of Nisus will want to note that Personal Computer Peripherals Corp., of Tampa, Florida, will be bundling a demo version of Nisus with every new MacBottom hard-disk drive and monitor, along with a $50 rebate toward the purchase of Nisus.

GREP and macros make Nisus unparalleled at massaging large amounts of text. If you've been looking for a powerful word processor without the sluggishness of FullWrite, the command complexity of Word, or the un-Macintosh feel of WordPerfect, your search may be over.

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MACUSER RATING

Nisus ★★★★

Follows Mac Interface	■ ■ ■ ■ ■
Printed Documentation	■ ■ ■ ■ □
On-Screen Help	■ ■ ■ □ □
Performance	■ ■ ■ ■ ■
Support	■ ■ ■ ■ ■
Consumer Value	■ ■ ■ ■ □

Comments: A moderately feature-filled word processor with powerful text editing. **Best Features:** Easy-GREP, graphics integration. **Worst Features:** Cross-referencing markers, lack of footnotes and hyphenation/kerning functions. **List Price:** $395; first upgrade free to registered owners. Version 1.0 reviewed. Published by Paragon Concepts, 990 Highland Drive, Suite 312, Solana Beach, CA 92075; (800) 922-2993; (619) 481-1477. Requires 1 megabyte RAM, System 4.2 or later, two 800K drives or a hard disk. Works on Mac XL or Lisa running MacWorks. Not copy-protected.

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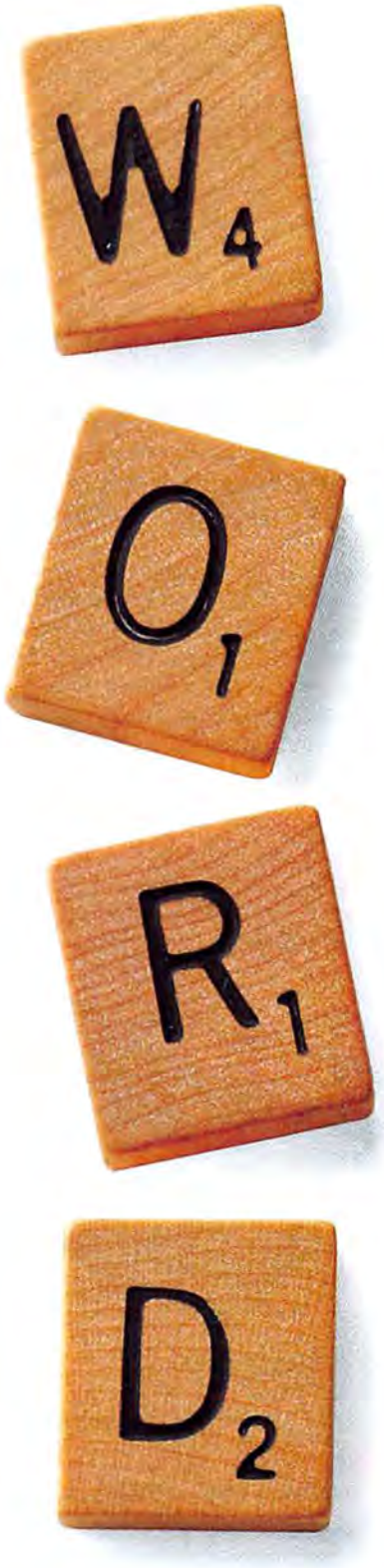
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The Latest Word



Microsoft has a solid winner in Word 4.0, the top of its division in the heavyweight word-processor wars.

When the first version of Microsoft Word hit the streets, it entered a software market that no software publisher will ever see again — one with no third-party competition. During the first year of the Mac's life, Apple bundled MacWrite with every system. If the idea of competing with a free program from Apple wasn't enough to dull a software developer's enthusiasm, there was the common knowledge that Microsoft, the largest software publisher in the world, had a word processor for the Mac on the way.

Word would have had easy pickings competing against MacWrite even if it hadn't offered such enticements as keyboard commands, a glossary, mail-merge, footnotes, and rulers attached to paragraphs. As impressed as we Mac users were with those improvements over MacWrite, however, we were not so dazzled that we failed to notice that Word 1.05 was a slow and often awkward program that should have been upgraded — with at least a built-in spelling checker — long before it was. Most of us figured out that the reason Word 2.0 never saw the light of day was that, in the face of zero competition, the only motivation Microsoft would have had to replace its best-selling version 1.05 was goodwill.

Then Apple decided not to give MacWrite away, opening up the market enough for programs such as WriteNow to make some inroads into Word's dominion. That forced Micro-

By Charles Spezzano

soft to release Word 3.0, which packed many of the features that it had developed for IBM versions of Word. In the DOS arena, Microsoft had to offer some heavyweight features to compete with WordStar and WordPerfect. Word 3.0 inherited style sheets, an outliner, and a spelling checker. Speed was also improved. Still, there was evidence that Microsoft knew it had evaded real competition by turning Word into the only heavyweight word processor for the Mac.

That evidence came in the form of enough bugs in the first shrink-wrapped release of version 3.0 to keep an entomology graduate student excited for years. Although most of those defects were cleared up in versions 3.01 and 3.02, too many users were still reporting too many crashes — especially when working with large files. Fortunately, the business and professional community fell in love with the Mac, and that drew some heavy hitters from the IBM world — namely WordPerfect and Ashton-Tate (with its adopted child, FullWrite) — into the Mac word-processor marketplace. A newcomer, Nisus from Paragon Concepts, has just entered the fray with some new features and a good dose of competitive promise (see "Nisus: The Writer's Tool" in this issue).

As a result, Microsoft has really had to listen to user wishes and complaints in designing Word 4.0. The pressure has yielded impressive results. To begin with, Word is still up there as one of the only *fast* heavyweights among Mac word processors (although the first reports indicate that Nisus, too, is fast). More subtle, but no less important, is Microsoft's decision not to take FullWrite's bait and try to become a combination word processor and full-fledged desktop-publishing program. Instead, Word 4.0 is simply the most usefully featured word processor available for any personal computer — with good speed, versatile editing, and enough page-layout capabilities to prepare any kind of document required in business and professional settings. [*At press time, senior technical writer James Finn suggested that Nisus' speed, editing, text wrap around irregular graphics, and built-in drawing abilities might have qualified some of Mr. Spezzano's assessments at this juncture, had he been able to use Paragon's product. — Ed.*]

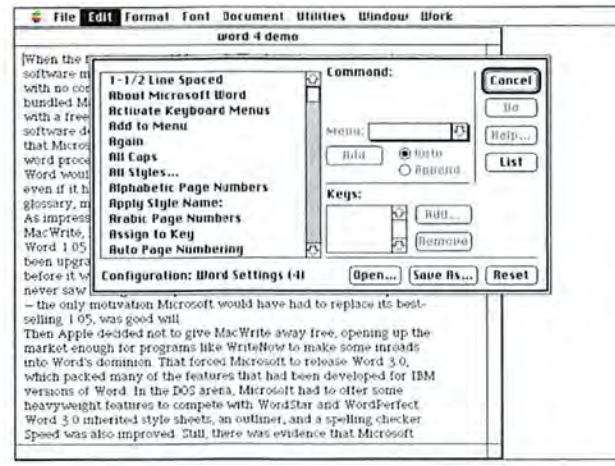


Figure 1: Word 3.0 offered its users limited menu customization, but Word 4.0 lets you completely redesign menus. The Commands dialog box, shown here, lets you move commands from one menu to another as well as redefine their Command-key equivalents.

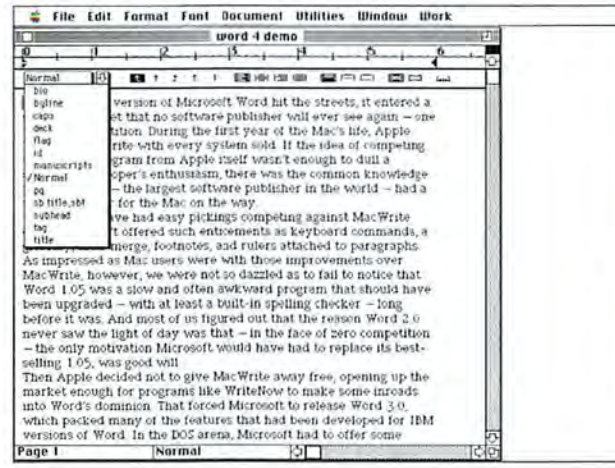


Figure 2: Word 4.0's ruler has been greatly improved. This pop-up menu lists all the available styles for this document. You can invoke styles simply by selecting them from the menu. The icon on the extreme right is the scale icon. It lets you view three scales: normal (shown here), for text-column boundaries and tabs; page, for margins and paper edge; and table, for table columns and boundaries.

First, let's take a look at what's transformed in the maturing of Word 3.02 into Word 4.0.

WHAT'S BETTER, WHAT'S NOT

You could customize Word 3.0's menus, but you can *redesign* Word 4.0's. Using the Commands option on the Edit menu, you can move or add any command to any menu. The same dialog box can be used to change any keyboard command or to create a new one (see Figure 1).

If you're not into customizing, the default menus and dialog boxes are better organized than those of version 3.0. The Insert Page Break command on the Document menu will be an especially welcome addition for most users.

After years of writers' carping, Word finally offers a background repagination option that you turn on and off from the Preferences dialog box. During lulls in your typing, the program quickly and unobtrusively updates page breaks.

The outliner is better than the one in Word 3.0, but it's still not a contender. Each paragraph (heading) has its own icon that you can use to select it and all subheadings and text beneath it, eliminating the need for cutting and pasting when you want to drag a family of items to a new location. Also, the size of an entry is now unlimited. Despite these improvements, the basic personality of the outliner is stodgy and rigid, lacking the automatic renumbering of a moved heading that has become standard equipment on all smooth outliners.

One thing I would like to have seen



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What's New with Word 4.0

- Tables command with independent cell formatting.
- Hot links to Excel, Microsoft Mail, and SuperPaint 1.1.
- Fully customizable menus.
- Color support.
- Dynamic pagination and true WYSIWYG display (at long last!).
- Improved ruler, with Style selection box and variable-scale display.
- Text wrap around graphics.
- Absolute positioning for text and graphics.
- Comes bundled with AutoMac III, SuperPaint 1.1, and WordFinder.
- Improved outliner.
- Improved indexing and table-of-contents creation.

improved is the line-numbering feature: it shows only in Print Preview and in the printed document, not even in Page View. It would have been useful, especially for writers and editors who have to write to meet certain lengths, to see line numbers on-screen.

On the other hand, the ruler has been improved (see Figure 2). There's a new scale icon that lets you cycle through normal scale (paragraph settings); page scale (margin settings); and, when a table is in use (more on that feature later), table scale (for column adjustments). Zero can now be shown as the left edge of your page in page scale.

Style sheets are a Word trademark in both the DOS and Macintosh word-processing arenas. For readers new to Word, a style is a collection of paragraph and character formats that you apply to a paragraph with one command. Each style has a name that you assign. The entire list of styles you create for a document is called a style sheet. Word has sometimes been criticized because style sheets exist within a document rather than as freestanding entities that can be attached to any document. It's so easy to copy an existing style sheet from one document to another, however, that this hardly seems a practical limitation in day-to-day use.



Word 4.0's hottest new option is the Tables feature, which enables you to set up multicolumn tables of text and graphics without the agony of using tabs.

In any case, if you like style sheets, you'll appreciate the improvements to them in Word 4.0. You can now create and apply styles from a pop-up style menu on the ruler, without going through the Define Styles or Styles dialog boxes.

Word 4.0's new Plain For Style command on the Format menu returns selected text to its base style. It cancels all character formatting, such as bold or italics, that is not part of the style of the paragraph but has been applied manually to the selected text. A related time-saver is that double-clicking on the ruler opens the dialog box in which you set paragraph formatting.

Remember creating an index with Word 3.0? You had to type index codes before and after the entry text and then format the codes as hidden text. The process was like cataloging lint from your blue blazer. Word 4.0 mercifully supplies a much-improved system for identifying items as entries for an index or a table of contents. A menu command inserts the codes for you and formats them as hidden text.

Finally, you can insert dynamic date and time entries in a variety of formats anywhere in a document, using Word 4.0's new glossary entries. You can also now paste text into the Find What and Change To fields of the Find and Change dialog boxes.

For many programs, improvements such as these would be enough for a new version, but there's a lot more that's new in Word 4.0.

THE NEW STUFF

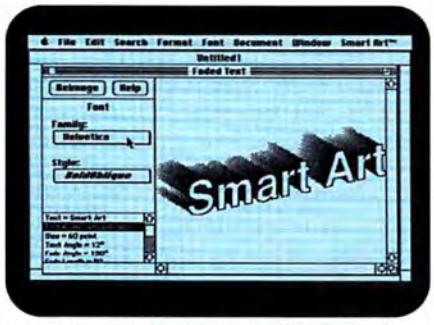
Word 4.0 is now divided into four views (Galley, Outline, Page, and Print) instead of three. With Word 3.0, you wrote and edited a document in Galley view and then switched to Page Preview to see on-screen a reduced-size display of printed pages with headers and other elements. To make changes, however, you had to return to Galley view. In Word 4.0, two new views replace Page Preview.

Page View is a fully editable WYSIWYG mode that includes on-screen headers, footers, and multiple columns. If you want an overview of an entire page, you can switch to Print Preview. Although this system is better than that in Word 3.0, it's not as smooth or as quick as it might be. Because Page View restricts you to viewing one page at a time, you can't view and edit the bottom of one page and the top of the next page at the same time. This is a pain in the neck when

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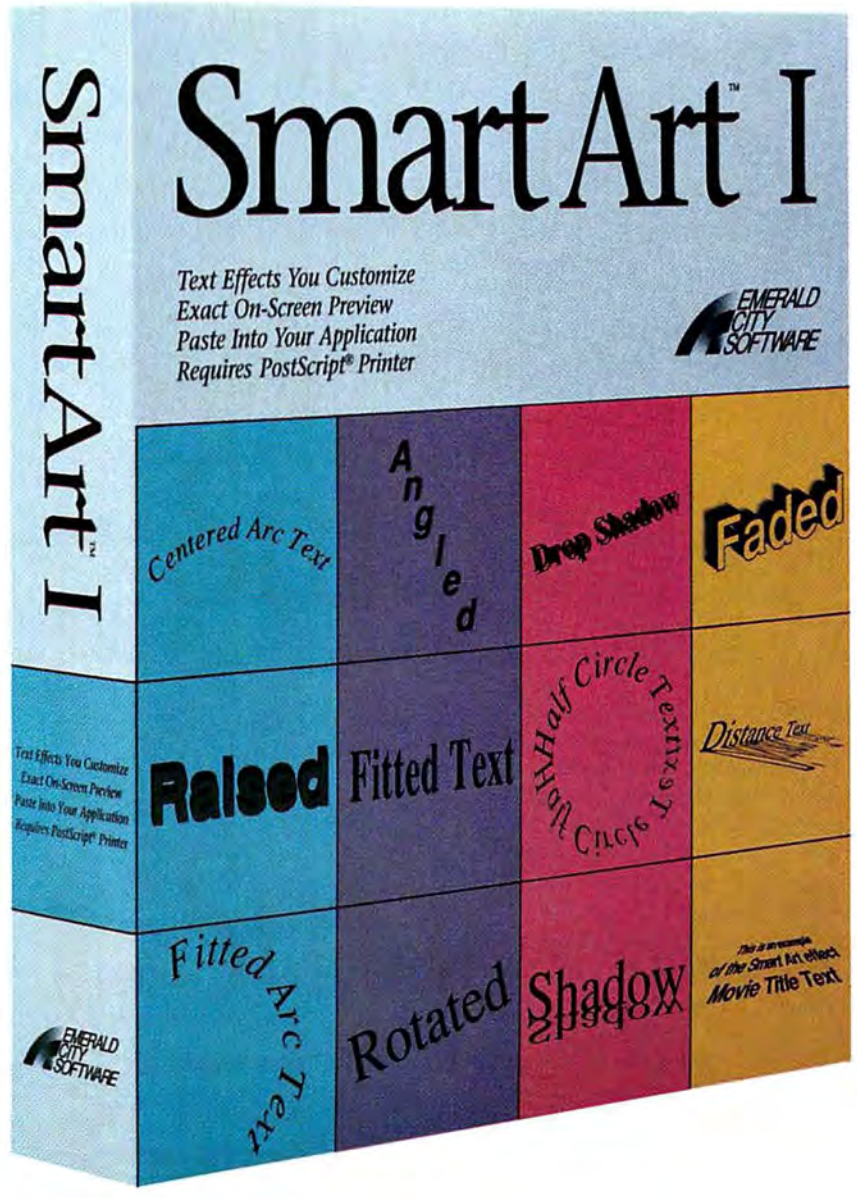
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you're trying to adjust snaking columns, because you must use Page View or Print Preview to see them.

No heavyweight word processor can completely ignore the excitement of desktop publishing. With Word 4.0, text flows around the rectangular space containing a graphic (see Figure 3). It's not the same as the full-fledged feature found in dedicated desktop-publishing programs, which let you flow text around the contours of a graphic, but it adds a lot to Word's publishing capabilities.

In addition, if you drag a graphic to a new location in Print Preview, the text repositions itself. This ability is part of Word 4.0's new fixed-positioning feature. You can treat a block of text in the same way. The object stays put, and text flows around it as you edit. This system lets you tell Word exactly where on the page to place a block of text or a graphic without advanced calculus or multiple command sequences. You can also open Paint files directly in an untitled Word 4.0 window.

WHAT'S BEST

Without a doubt the hottest new option in Word 4.0 is the Tables feature, which enables you to set up multicolumn tables containing text and graphics without the agony of using tabs (see Figure 4). Beginners will want to turn on the Show Paragraph Marker feature (to display the end-of-cell markers), although this step is optional, and choose Insert Table from the Format menu. Word gives you a spreadsheetlike grid. Text wraps within each cell, and the rows expand to the size of the largest cell in the row. The number of rows (unlimited) and columns (up to 32) can be specified when you insert the table into your document, or it's possible to start with the default of 1 row and 2 columns and add more of either one when you need them. You can adjust column widths by using the ruler or entering values even after the text has been entered. If you change the cell width, the text will rewrap to fit the new cell size. If you have ever created a document with multicolumn tables and then endured trying to keep each row and column in

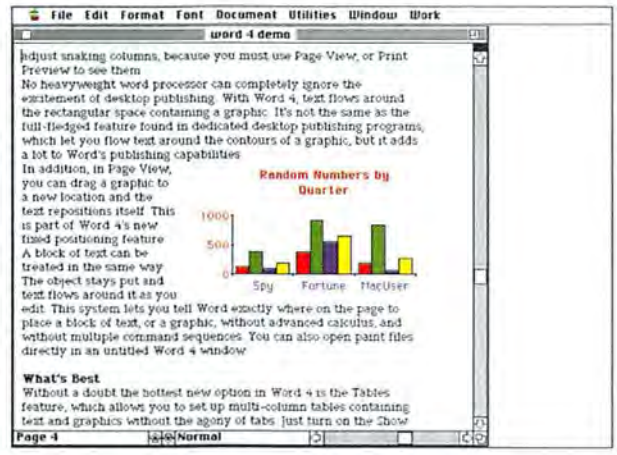


Figure 3: Word 4.0 lets you insert graphics and flow text around them. You can't wrap text tightly around an irregularly shaped image, but you can flow it around the graphic's frame. This example is in Word 4.0's new, fully editable WYSIWYG mode, Page View.

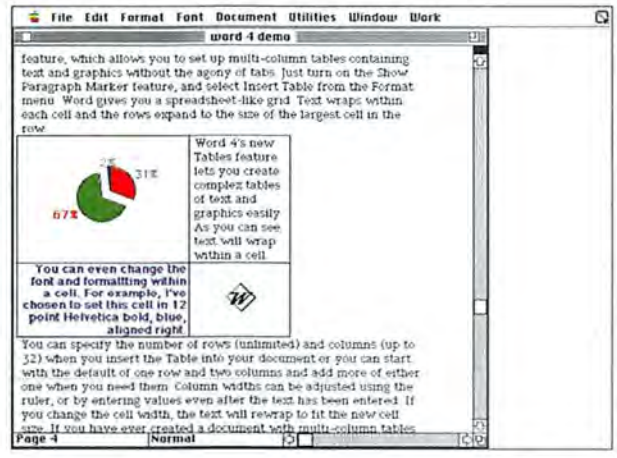


Figure 4: Word 4.0's Tables command is the program's best feature. A menu command inserts a table, and the cells can contain text or graphics. Each cell can be formatted independently. Text wraps within the cell, and the rows expand automatically. Creating side-by-side columns was never easier.

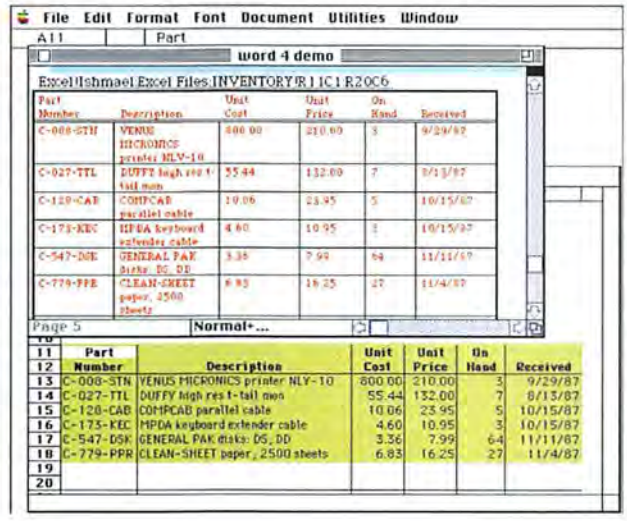


Figure 5: Word 4.0's Paste/Update Link command lets you dynamically link your documents, so they'll update with just a menu choice. The source application must support Microsoft's enhanced QuickSwitch capabilities under MultiFinder, and right now only Excel and SuperPaint do so. The header above the table indicates the "address" of the data contained therein. If the Excel data changes, you can update the Word document by choosing Update Link. (The header is formatted as hidden text and won't appear when you print the Word file.)

line while you added and deleted text, Word's Table feature will be a peak experience for you.

Using the Borders option, you can place borders around the whole table or around selected cells within the table. Borders come in five different styles: single lines; thick lines; double lines; dotted lines; and, on PostScript laser printers, hairlines. You can't specify line weights.

The more you use the Tables feature, the more you notice how slick and flexible it is. For example, I had created about ten such tables for a book before I realized that whenever a table flowed over from one page to the next, Word inserted a page break only between rows, never in the middle of one.

You can also copy data from Excel into a Word table. With the new Paste Link command and the built-in QuickSwitch facility running under MultiFinder, if the original information changes, you can use Word's Update Link command to update the corresponding Word table automatically (see Figure 5).

Word also provides direct access to Microsoft Mail. The Send Mail command lets you send your current Word 4.0 document directly over Mail (if it's installed in your system).

PLUSES AND BONUSES

Every Word 3.0 user will find something to celebrate in Word 4.0's large list of new features. Writers will welcome the word-count feature in the Utilities menu and the automatic smart-quotes option in the Preferences box. Mac II owners will be delighted to hear that Word 4.0 supports color.

Everyone will find the program easier to operate with the new "hot spots," which provide direct access to some options when you double-click on a certain part of a document or window. Double-clicking on a hot spot — the ruler, for example — immediately takes you to a relevant dialog box or another window.

If that's not enough, Word 4.0 comes bundled with a copy of AutoMac III, a macro-making INIT; SuperPaint 1.1; and WordFinder, Microlytics' thesaurus. You also get fulfillment coupons for DocuComp, a document-comparison utility, and Mac Daisy Link, a driver for daisy-wheel printers; each can be purchased for $10.

THE FINAL WORD

Among the heavyweight Macintosh word processors, nobody does it better than Word 4.0. It's much better adapted to the Mac environment than WordPerfect and offers more useful features. Unlike FullWrite, it actually fits into the memory of a Plus or SE. Finally, and I hope I won't live to regret this statement, Word 4.0 did not crash on me once — even in its late beta versions. This is one fast, smooth, and full-featured winner of a word processor.

CHARLES SPEZZANO, PH.D., WRITES ABOUT PSYCHOLOGY AND PERSONAL COMPUTERS. HE IS THE AUTHOR OF TWO BOOKS AND NUMEROUS ARTICLES ON IBM AND MACINTOSH HARDWARE AND SOFTWARE.

And When You Can't Find It in the Manual...

Word 4.0's power and numerous features can't be fully covered in the manual, so a number of publishers have stepped forward to fill the gap. You should be able to find these titles in your local computer store or bookstore soon.

Bantam Books
666 Fifth Ave.
New York, NY 10103
(212) 765-6500
Mastering Word 4.0 for the Macintosh
By Pamela S. Beason; $21.95

Brady Books
One Gulf & Western Plaza
New York, NY 10023
(212) 373-8500
Microsoft Word 4.0 Power for the Macintosh
By Robert Eckhardt; $24.95

Howard S. Sams
4300 West 62nd St.
Indianapolis, IN 46268
(317) 298-5400
Understanding Microsoft Word 4.0 for the Macintosh
By Richard Swadley; $18.95

Microsoft Press
16011 N.E. 36th Way
Box 97017
Redmond, WA 98073-9717
(206) 882-8080
Working with Word, Second Edition
By Chris Kinata and Gordon McComb; $21.95
Quick Reference Guide to Microsoft Word for the Mac
By Lisa Ann Jacobs; $5.95

Osborne-McGraw Hill
2600 Tenth St.
Berkeley, CA 94710
(415) 548-2805
Microsoft Word Made Easy for the Macintosh, Version 4
By Paul Hoffman; $19.95

Que Corp.
11711 N. College Ave.
Carmel, IN 46032
(317) 573-2500
Using Microsoft Word, Second Edition
By Marsha Zager and Claire Chase; $21.95

Sybex
2021 Challenger Drive #100
Alameda, CA 94501
(415) 523-8233
Mastering Microsoft Word on the Macintosh
By Hilda Sendyx; $22.95

MACUSER RATING

Microsoft Word 4.0

★★★★½

Follows Mac Interface	■ ■ ■ ■ □
Printed Documentation	■ ■ ■ ■ ■
On-Screen Help	■ ■ ■ ■ ■
Performance	■ ■ ■ ■ ■
Support	■ ■ ■ ■ □
Consumer Value	■ ■ ■ ■ ■

Comments: The winner among Macintosh heavyweight word processors. **Best Features:** Tables feature, which lets you easily build multicolumn tables of text and graphics; style sheets; hot links to Excel; and transparency with Microsoft Mail. **Worst Features:** Could use a better spelling checker. Powerful but un-Mac-like mail-merge. Clunky outliner. **List Price:** $395. Upgrades $75 for registered Word 3.0 users. Includes AutoMac III, SuperPaint 1.1, and WordFinder. Published by Microsoft, 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; (206) 882-8080. Requires 512KE or later, two 800K floppy-disk drives or hard disk, System 3.2, Finder 5.3 or later. Supports eight colors on Mac II. MultiFinder friendly. Not copy-protected.

Word Processors Compared

Feature	Nisus 1.01	FullWrite 1.1	Word 4.0	WordPerfect 1.0.2
Find/replace by font, style	yes	yes	no	no
Find/index*	yes	no	no	no
Kerning (manual)	no	yes	yes	yes
Smart quotes	†	yes	yes	no
Hyphenation	no	yes	yes	yes
Widow/orphan control	†	~	yes	yes
Keep together	yes	no	yes	yes
Footnotes/end notes	no	yes	yes	yes
Figure numbering	†	yes	no	no
Style sheets	§	yes	yes	no
Macros	yes	no	◊	yes
Outlining	no	yes	yes	yes
Mail-merge	†	yes	yes	yes
Newspaper columns	yes	yes	yes	yes
Parallel columns	no	no	yes	yes
Variable column width	no	**	yes	yes
Built-in graphics	yes	yes	◊	no
Text wrap around graphics	yes	yes	yes	no
Text wrap, irregular graphics	yes	yes	no	no
Words in spelling dictionary	80,000	100,000	130,000	115,000
Flags double words	yes	no	no	yes
Flags incorrect forms	yes	no	no	no
Thesaurus entry points/synonyms††	42,000/470,000	15,000/220,000	15,000/220,000 ◊	10,000/100,000
Levels of backtrack	10	10	10	3

*All these word processors support indexing; this is a special Nisus feature.
†Implemented in a supplied macro.
§Character-based styles only.
~Widow only.
◊Separate program supplied.
**Can be accomplished with sidebars.
††Both FullWrite and Word 4.0 use a thesaurus licensed from Microlytics.

Directory

Nisus 1.01
Paragon Concepts, Inc.
990 Highland Drive, Suite 312
Solana, CA 92075
(619) 481-1477
$395

FullWrite Professional 1.1
Ashton-Tate Corp.
20101 Hamilton Ave.
Torrance, CA 90502-1319
(213) 329-8000
$395

Word 4.0
Microsoft Corp.
16011 N.E. 36th Way
Box 97017
Redmond, WA 98073-9717
(206) 882-8080
$395

WordPerfect 1.0.2
WordPerfect Corp.
1555 N. Technology Way
Orem, UT 84057
(801) 225-5000
$395



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A total "Input System" with programmable menu-strip.

Kurta IS/ADB's give you a built-in "menu-strip" featuring 11 to 23 function keys. They can be loaded with time-saving, sophisticated macro commands or with simple keyboard shortcuts you create with Apple® Computer's new MacroMaker.® Kurta also gives you the option to put the macros in your hand. Because our IS/PENWORKS® for Macintosh® ADB lets you load the macros and shortcuts on 4-button or 12-button cursor keys. To execute a command, simply quick click on the function key or cursor key instead of going up and pulling down from the menu bar. Fast action, no window flashing, and exactly the same way every time.

Cordless cursors and pens with no equal.

In addition to corded models, Kurta offers award-winning cordless 4-button cursors and 3-switch pens. There are six Kurta pointing devices in all, including the new Kurta 12-button cursor for maximum application control with instant touch.

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User Maintenance	Yes	None	No Hassle
Programmable	No	Up to 12 Buttons and up to 23 Function Keys	Keyboard Commands Without The Keyboard
Warranty	Lifetime	Lifetime	No Worry
Pen or Cursor Choice	No	1,2,3 Switch Pen or 4, 12 Button Cursor	More Natural Feel

Built-in software gives you automatic ADB drive.

Only Kurta ships a software interface driver in every package that makes more than 98% of all software Kurta-compatible. Kurta's IS/PENWORKS drivers for the Macintosh ADB and serial ports feature Kurta's exclusive "dynamic scaling" to miniaturize/maximize the active area—whether you are enhancing CAD applications on AutoCAD® or VersaCAD® or others, working with desktop publishing packages, or creating graphic designs.

A time to compare, a time to act.

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- Rugged construction in 3 sizes (8.5x11, 12x12, and 12x17), replaceable heavy-duty surface protector, 8° ergonomic tilt, and more.
- Kurta exclusive dynamic scaling and Macro Storage keys let you tailor macros for harder working applications in Desktop Publishing, Freehand Drawing, and CAD. Zip across the screen when working with text applications.
- Built-in logic eliminates cumbersome interfaces and conversion boxes from your workspace.
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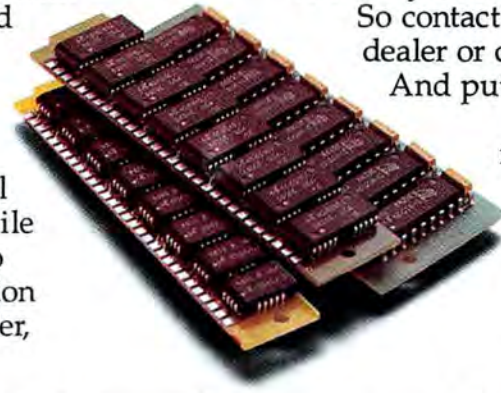
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Hands-on CAD

By David L. Peltz and the MacUser Labs Staff



Once you could do CAD seriously, or you could do it affordably. Now some easy-to-learn CAD products for the Mac let you have it both ways.



PHOTOGRAPHY GEOFF NELSON

If CAD (computer-assisted design) is such a powerful tool, why don't more people use it? A recent survey found that nearly 80 percent of today's technical professionals still use traditional methods for sketching, drawing, drafting, and design. The typical reasons for resisting CAD are that it is too complicated, too expensive, or too difficult to learn. Potential users lament that they don't have the time to learn a CAD package, that they won't use it enough to justify the investment in training, or that their work is insufficiently complex to merit it.

With the advent of the packages considered here, these excuses no longer apply. Low-end CAD packages for the Mac justify themselves for relatively demanding applications as well as easy, "casual" use.

CAD is not a new tool — it has been around for more than 20 years. As such, it is a mature and proven technology. What is news, however, is the changing nature of the CAD *user*. The Macintosh brings the power of CAD to the fingertips of mere mortals, even mortals pressed for time. It also makes CAD accessible and affordable. It considerably broadens not only the user base but also the range of applications and market conduits for CAD products.

Starting at $100, these Macintosh CAD products are within the reach of everyone. You don't need to be a millionaire to afford them. You don't need to be a rocket scientist to understand them. You don't need to spend a large percentage of your lifespan acquiring the operational skills to master them. And they are available at local software stores. This is also news, as CAD packages have previously been available only through specialized CAD resellers.

From the 40 CAD offerings now available for the Macintosh (see "What You Don't Get" sidebar), we review three packages that are readily available through mass-distribution channels. The three products are Claris CAD ($799) from Claris (Mountain View, California); DREAMS ($500) from Innovative Data Design (Concord, California); and Generic CADD Level 1 ($99.95 for version 1.0, $149.95 for version 1.1) from Generic Software (Bothell, Washington). Our criteria for deciding which products to review were that they had to be

- Stocked by established networks of major software resellers.
- Low in price (as CAD software goes).
- Shrink-wrap released and available.
- Likely to attract a wide range of purchasers.

Many Macintosh CAD products meet most of these criteria, but only Claris CAD, DREAMS, and Generic CADD meet them all. Each of the companies that developed these packages has proclaimed a strategy of bringing CAD to a mass market — they have committed the promotional budgets, marketing resources, and technical support to make it happen. Furthermore, they have a good grasp of CAD's new role as an adjunct to other engineering tasks.

This understanding contrasts with the view of their smaller competitors, who tend to regard CAD as the all-encom-

MacUSER LABS

passing need of their customer base.

When you open a low-end CAD package, you should expect reliable, well-designed, and easily understood software; well-prepared, well-written documentation; tutorials; help facilities; and perhaps a videotape. You also need some things you *won't* find in the box: upgrade programs, user newsletters, and a multiphone help line (as opposed to a single support line, which is often busy). The three applications examined here meet these expectations.

Test Notes

During our evaluations, we learned that Generic Software was working on a revision (1.1) that provides additional capabilities. We examined a beta copy of this version. It was developed enough at press time to be included in both our Summary of CAD Features chart and in our performance timings, but because the package was in beta form, we stopped there.

As this issue went to press, VersaCAD introduced a reduced-cost, mass-distribution version of its popular high-end CAD product. At $995, VersaCAD Drafter 2.0 sells for half the price of VersaCAD/Macintosh Edition 2.0 ($1,995). For purposes of comparison, we included VersaCAD Drafter in our features chart. We will give it a full review in an upcoming issue.

We included an earlier CAD product, MacDraft, from Innovative Data Design (IDD), in our features chart, although we did not test it. MacDraft warranted inclusion because more than 65,000 copies of it are in use, it is still being sold in quantity, and the differences between this package and DREAMS are significant.

Likewise, we included Claris' MacDraw II in the features chart primarily because of its popularity (it is among the top-ten best-selling Mac products) and to underscore the extensive differences between MacDraw II and Claris CAD.

Purpose of Our Tests

Although the low-end products we tested don't do everything their more-expensive cousins do, they are real, accessible CAD products. We wanted to answer the following questions about each of these products:

- How accessible is it?
- How easy to learn and use?
- How fast?
- How reliable?
- How comprehensive?
- How powerful?
- How good is the documentation?

In short, MacUser Labs aspired to explore the viability of this new class of CAD products. The Labs has traditionally tested peripheral and add-on hardware products, with their easily defined, easily measured performance parameters. For CAD software, however, developing meaningful tests is not so simple.

The Labs approached testing from different directions simultaneously. We examined learning curves, ease of use, and performance characteristics for each package. Our goal was to provide accurate software-performance comparisons as well as opinions on experiences with the products from a range of users.

To find out how easily beginners could learn and use the applications, we engaged 11 college students at California State University, Northridge (CSUN), to test the products. The students could provide us, we reasoned, with a viewpoint akin to that of potential CAD purchasers because they were able to devote only part-time study to the packages and had varying degrees of exposure to and experience with CAD.

During a three-week period, the students had to learn the three CAD products and produce three drawings per product: an organization chart, a dimensioned mechanical part drawing, and a floor plan of a small house. They got one week with each product. At the end of each week, the students were required to deliver the drawings and complete a detailed questionnaire before proceeding to the next product. We also asked them to judge the quality of each package.

To compare the students' observations, measurements, and conclusions with those of someone with more design experience, we engaged a professional designer to perform exactly the same exercises in the same time period.

The results from these tests are highly consistent. The testers were in general agreement about the three CAD products. Our in-house performance benchmarks were timed in the MacUser Labs by professional testers under tightly controlled conditions. The three software manufacturers were asked to participate in an advisory capacity and provided input on the Labs' Test Script. Each of the companies commented on how the tests could be most effectively conducted with its product.

For more than 20 years, how to test CAD software has been subject to debate. Although many have tried to test CAD performance, no perfect way has been found. We wanted to measure performance as fairly as possible. To that end, MacUser Labs' staff created an identical drawing file on each of the products, con-

Students' Evaluation

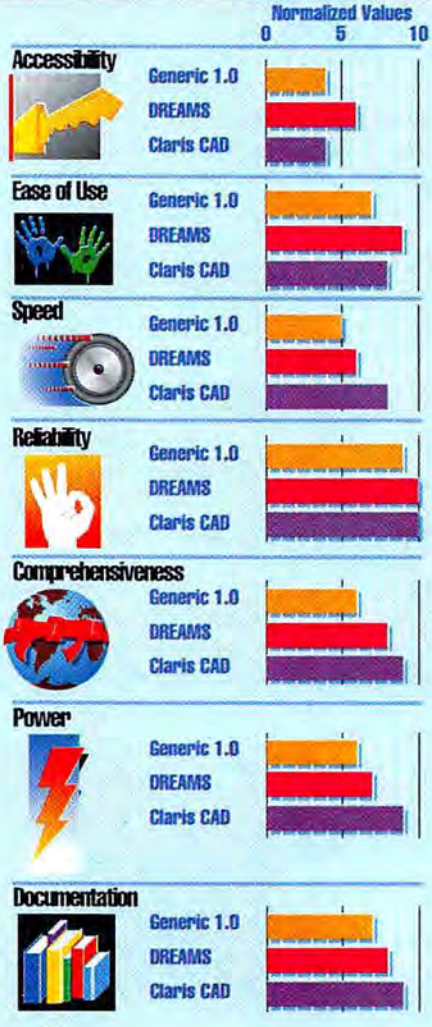


ILLUSTRATION: DANIEL CLARK

sisting of 100 groups of graphic elements arranged in a 10 x 10 array. This approach gave us functionally identical data to use with each product, although the three files were different sizes.

Tests were subsequently performed, product by product, using the same Macintosh configurations.

We timed each program as it performed common CAD operations: redrawing, dragging/moving, zooming in and out, rotating, and ungrouping. These frequently used CAD operations were selected because they are the operations that usually keep users waiting. We eschewed the classic benchmarking approach (recording the time it takes advanced users to create a certain drawing on competing applications) because it depends largely on the operator's skill rather than on the application's speed and performance.

The Labs' timing tests show a direct relationship between product cost and performance. The most expensive CAD product we tested (Claris CAD) was generally the fastest.

A Quick History

In the late '60s, if your engineering department had a few million dollars for hardware, a few million more to develop software, and a dungeon full of assembly-language programmers, you might have been able to generate simple 2-D drawings with a mainframe computer. Such was the case at major aerospace companies such as Lockheed and at automotive giants such as GM.

That original technology has since evolved and has now migrated to Macintoshes. Today's Mac CAD products are more comprehensive and polished than their mainframe ancestors ever were. Today's mainframe CAD facilities also evolved from the same roots, but they are currently faster, more capable, and more sophisticated than they were in the late '60s. They retain one link with the past, however: they're very hard to learn.

The few original CAD users were full-time operators. Their employers could afford to buy only one or two CAD consoles, so the user ranks remained thin. Users took months to learn CAD and then spent the balance of their woeful lives in the glow of bulky, colossally expensive display consoles.

The per-hour cost of CAD at that time was so huge that only the most important, complex tasks were performed with computers. Overhead was high and salaries were low, so the cost of training was minute compared with the cost of implementing an entire CAD system. Hence, no one paid much attention to training.

The entire CAD industry evolved with this mentality. Everyone assumed that CAD *had* to be difficult, *had* to be a trial to learn, because — well, that's the way the world worked. To get people to use their products, CAD vendors hired teachers and organized schools. But a pattern was established, and unfortunately that pattern still reigns at the high end of today's CAD market, where training support is still badly needed.

Over the past 20 years, CAD hardware has become dramatically more affordable. The cost per "CAD seat" (an industry term for what a single operator requires) tumbled, first down to the hundreds of thousands of dollars, then to tens of thousands, and finally — with the advent of personal computers — to only a few thousand dollars.

Training costs began to rise as software remained complex, and meanwhile the costs for engineering labor headed through the roof.

By about three years ago, the situation had reversed from what it was 20 years ago: it became more expensive to *learn* CAD than to *buy* it. Time may be relative, but it is also money. That's why CAD on the Macintosh has grown so quickly.

Claris CAD, DREAMS, and Generic CADD Level 1 differ from each other like a Mac Plus differs from an SE, or an SE differs from a II or IIx. Like the Macs,

NEWS

Autodesk to Buy Generic CADD

At press time we learned that Autodesk (Sausalito, CA), maker of AutoCAD, had signed a letter of intent to purchase Generic Software (Bothell, WA), maker of the Generic CADD product family. The combined user base of both companies reportedly exceeds 500,000.

If the deal goes through, the actual effects of the merger will be widespread. The move would give Autodesk an instant mass-distribution channel in the U.S. (which it now lacks) and a new low-end customer base from which it could lure future buyers of AutoCAD. Generic would gain technical and financial strength and immediate access to Autodesk's international markets.

Both companies would reportedly maintain their separate products and identities. Financial details of the acquisition were not released.

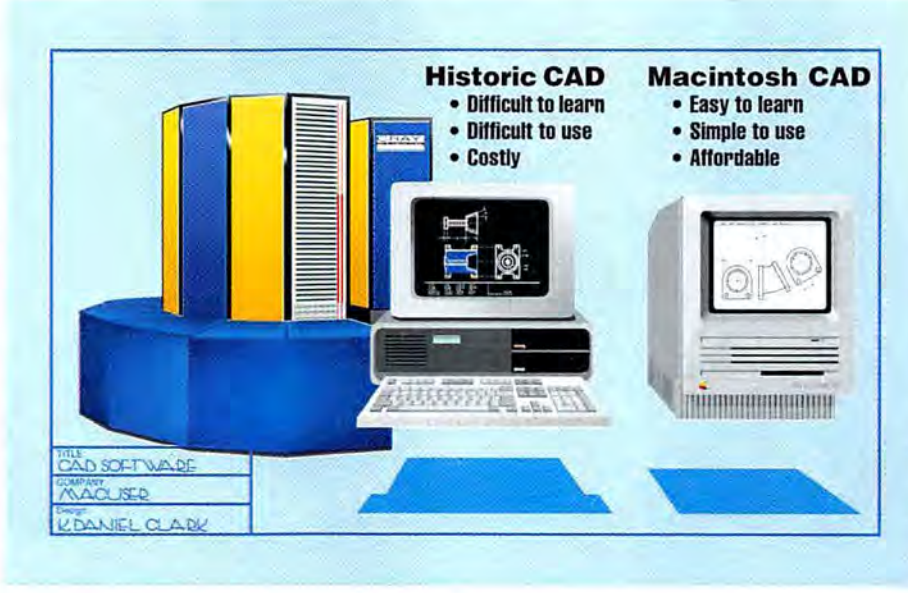


ILLUSTRATION: K. DANIEL CLARK

The fastest way to get here.



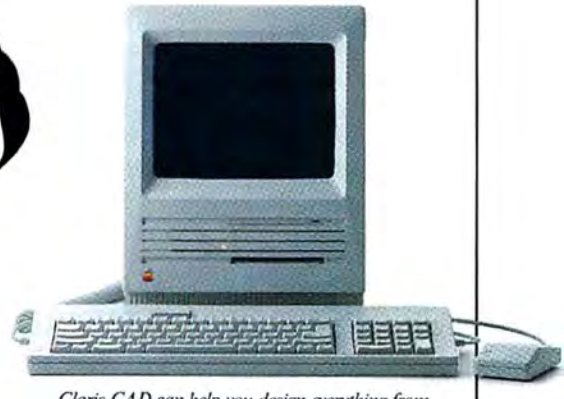
Claris CAD can't reduce the huge number of two-dimensional drawings it takes to get a plane off the ground. But it makes them a lot easier to do.



Claris CAD supports ANSI Y14.5 and other drawing standards. So those who design parts can share with those who design wholes.



Accurately drawing graceful curves like these becomes a simple matter of point and click.



Claris CAD can help you design everything from electronic schematics to the box they come in.



Claris CAD is the epitome of "less is more." Less time learning. More time creating.

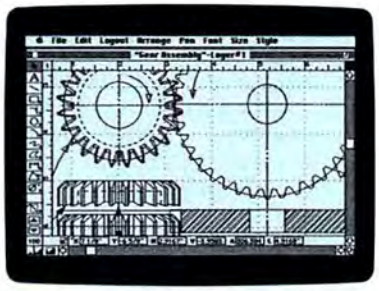
With the ability to draw in layers, you can hide essential details like wiring and plumbing just a click beneath an elegant exterior.



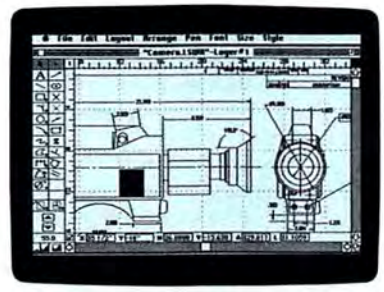
Draw the lines of fine design as finely as you wish: from 1.5 inches to .0001 mm.

© 1989 Claris Corporation, 440 Clyde Avenue, Mountain View, California 94043; **415-962-8946.** Starter Kit includes demonstration software, tutorial workbook and video. Offer expires September 30, 1989. A special

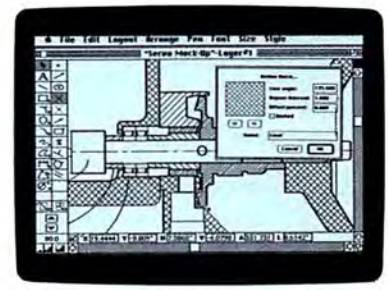
Is to start here.



Claris CAD is the first professional 2-D design and drafting tool to fully utilize the intuitive Macintosh way of working. So it takes hours to learn, not days.



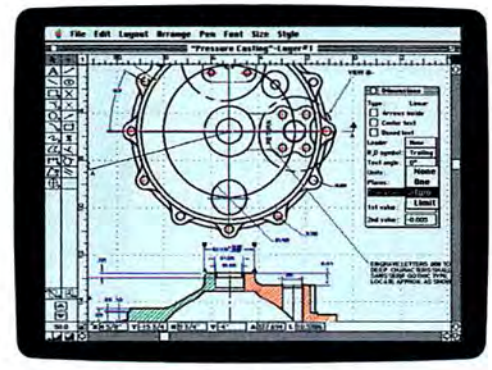
Fillets, tangents, keyboard entry, double lines and automatic dimensioning turn your ideas into realities with exacting precision.



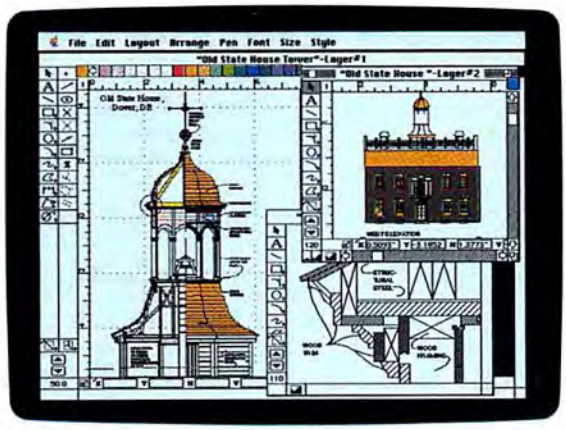
Customizable pens, dashed lines, hatch patterns and dimension appearance give you a new level of versatility.



Claris CAD makes it easier to sell your inspirations. Plot your plans, concept sketches, schematics and working drawings exactly as you see them, turn them into slides or overheads, or cut and paste them into proposals and reports.



Keeping the vision in your revisions is easy. Because you don't have to redraw from scratch.



Claris CAD integrates with other CAD software via optional IGES and DXF conversion programs. So you can move them to larger CAD/CAM systems for 3-D modeling and prototyping.



Here's the next step: order the Claris CAD Starter Kit, just $29.95 (refundable when you buy the complete program). To order, call 800-628-2100. And see how intelligent design begets intelligent design.

Introducing Claris CAD.

CLARIS™

introductory price is available to registered MacDraw II users. Call 800-628-2100. Claris is a trademark and MacDraw is a registered trademark of Claris Corporation. Macintosh is a registered trademark of Apple Computer, Inc. DXF is a trademark of AutoDesk, Inc. For the name of the Claris dealer nearest you, call 800-3CLARIS, ext. 200. In Canada, call 800-668-8948.

What You Don't Get

Generic CADD Level 1, DREAMS, and Claris CAD are relatively inexpensive and easy to learn. At first glance, they seem quite powerful. But there are nearly 40 other CAD products on the Macintosh market, and a lot of users are paying $3,000 and more to obtain features that Generic CADD, DREAMS, and even Claris CAD simply can't offer. Here's a look at what you *don't* get.

Highest on the list of what you don't get in the tested products is a 3-D database. All the applications we tested have 2-D databases. And, of the seven CAD products on the large Summary of Features chart, only one, VersaCAD Drafter, has a 2.5-D (x, y, and z-top/z-bottom) database. 3-D CAD isn't for everyone, but for those who need it, 2-D and 2.5-D products just won't do.

Several 3-D CAD products are available for the Mac. They start at $495 for Minicad from Graphsoft. Origins from Deltasoft is $595, Minicad+ $695, and PEGASYS II from IGC Technology $1,795. They provide some 3-D capability but come up short. Let's look instead at some applications with full-blown 3-D.



MicroStation Mac can show a hidden-line-removed, wire-frame detail of a shaded rendering.

3-D Super-CAD

Within the past year, some products have been announced that we call 3-D super-CAD. They come from some of the biggest and most established names in the CAD industry. Why didn't we test them? For starters, all but one (Infinite Graphics' IN-CAD) were still in the beta stage. It would be premature to review this family of CAD products based solely on our prerelease copies, but we can share some exciting prospects with you.

The four new 3-D super-CAD products for the Macintosh are AutoCAD from Autodesk ($3,000), IN-CAD from Infinite Graphics ($2,495), MacBRAVO! from Schlumberger ($1,500 to $2,300),and MicroStation Mac from Intergraph ($3,300).

That these products come from companies well established in the CAD industry lends credence to the Mac as a viable 3-D CAD platform. All four have features and capabilities superior to those of older 3-D CAD products available for the Mac and vastly superior to those of the three low-end CAD products reviewed on these pages. For example, all have extensive 2-D drafting features and sophisticated 3-D modeling, which includes hidden-line removal and the creation of shaded 3-D renderings. In this respect, they fall into two major 3-D modeling classes: 3-D *surface* modelers and 3-D *solid* modelers.

Surface modelers build 3-D objects by defining boundary surface characteristics. Objects are usually displayed as a mesh of connected lines in wire-frame depiction. Surfaces may be complex-curved (as with the contours of an automobile) or may consist of flat or curved planes. Surfaces may also combine complex curves with flat or curved planes. MicroStation Mac, AutoCAD, and MacBRAVO! are surface modelers. MicroStation Mac can produce shaded 3-D renderings. AutoCAD can remove hidden lines. MacBRAVO! up until now has depicted only wire-frame views, although it readily moves between 3-D model and 2-D drafting modes.

Solid modelers, in contrast, build 3-D objects by using 3-D primitives (cubes, spheres, and the like) and performing Boolean operations (adding them together, subtracting one from another) on them to form more-complex 3-D shapes. IN-CAD is the only solid modeler of the four Macintosh super-CAD products. Its 3-D facilities are extremely well designed and straightforward to learn and use. It can produce wire-frame views and fully shaded 3-D renderings at three user-selectable degrees of precision.

Both methods of 3-D modeling have their devotees and critics. Each excels at certain tasks. Airplane and automobile bodies, owing to their complex and irregular shapes, are best designed with 3-D surface modelers. Machine-part designers frequently favor solid modelers. Both methods work well for architectural design.

Don't expect to master any of these products in a few hours. They have more features than any CAD application at your local software store, and they come with huge manuals that bring new meaning to the word *commitment*. Of the four, IN-CAD and MicroStation Mac are the most Mac-like and should prove easiest to learn.

Infinite Graphics' IN-CAD has 2-D and 3-D operations that closely adhere to common interface conventions, letting you master them in a single sitting. But you'll need more time to explore the many other capabilities of this feature-rich and versatile application. Mechanical designers will delight in its 3-D performance. Excellent documentation lightens the learning load.

Intergraph's MicroStation Mac is more expensive, but it brings an unprecedented selection of 2-D and 3-D features to the Mac. It takes full advantage of Mac hardware facilities (such as multiple screens) and conforms to the Mac interface. Examined in prerelease form, each feature appears well implemented. There are so many features in MicroStation Mac that merely *running through* each one would take more time than our testers spent learning the low-end packages in this review. MicroStation Mac seems to be a high-quality product.

The prerelease version of Schlumberger's MacBRAVO! is far more Mac-like than AutoCAD yet has similar capabilities. Schlumberger's other MacBRAVO! platforms (BRAVO3 on DEC VAX, for instance) have even more advanced features that will inevitably find their way to the Mac.

Although AutoCAD is blessed with many features, Macintosh users will find its look and feel unfamiliar (unless they've learned AutoCAD on other platforms). But don't worry; Autodesk (creator of AutoCAD) has set up a worldwide network of training centers, and many schools and universities offer courses on the product. On other platforms, it takes weeks to become familiar with AutoCAD's vast array of features and months to master them. AutoCAD on the Mac seems likely to demand the same lengthy training, but apparently the effort is worth it, as there are an estimated 200,000 AutoCAD users worldwide.

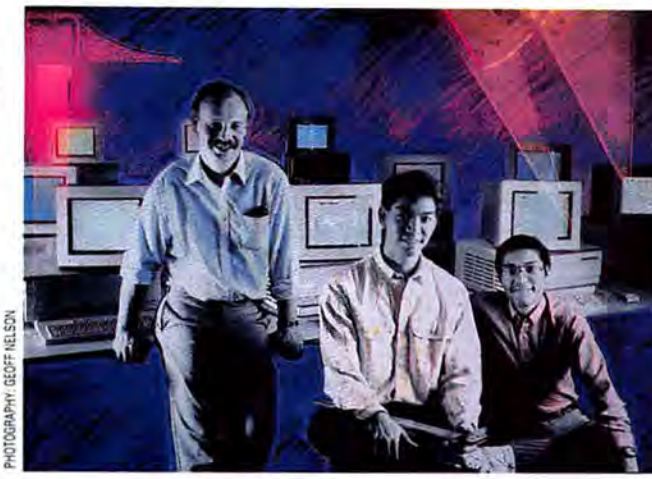
these CAD products share a common purpose while contrasting in features, performance, and price. Which Mac is the best? That depends on your budget and your needs. Which CAD product is the best? The answer is the same.

Generic CADD Level 1

Generic Software, developer of Generic CADD Level 1, began in the MS-DOS arena in 1985. With more than 100,000 copies shipped, Generic's DOS CAD product is second only to AutoCAD in number of users. The company's approach in the DOS world is to provide a very-low-cost kernel product and then surround it with add-on options to increase functionality.

Generic entered the Mac market in mid-1988, announcing two products: CADD Level 1 and CADD Level 2. Level 1 was delivered before the end of the year, but, as of press time for this issue, Level 2 had not yet shipped.

Generic also provides optional symbol libraries. Of the 26 types of symbol libraries listed in the company's catalog, 11 were available at press time. The libraries include symbols for architects, landscapers, electronic designers, and mechanical designers. There's even a set meant for programmers who want to draw flowcharts.



PHOTOGRAPHY: GEOFF NELSON

Left to right: David Weber, Alfred Manimtim, and Hakim Bass. They hope Generic improves its package with
- **Adjustable line thickness**
- **Customizable line types**
- **Dimensioning**
- **Font importation**
- **Scroll bars**

At $99.95 (or $149.95 for Version 1.1), Generic CADD Level 1 is extremely affordable. The product falls short of its upscale rivals in our features comparison, but it is a capable package for the money. Its database uses precise floating-point numbers (to 16 decimal places). You can save drawings in either single or double precision. Some people insist that serious drafting requires floating-point accuracy. That degree of precision might be useful in cases of extreme range (such as accurately locating a single rivet on an entire airplane), but such cases are not common. The drawback of double-precision floating-point calculations is that they usually take more time than less-precise ones. This speed reduction is reflected in Generic's performance in the timing tests. In six of the eight tests on an SE, Generic CADD was slower than the other two products (which don't use floating-point math in their calculations).

Generic CADD ships in a compact package consisting of two disks. The documentation is well written and generously illustrated, and it contains a tutorial that quickly gets you into the swing of things.

One of Generic CADD's big advantages is that it is very easy to learn. Our student testers averaged 2.4 hours of learning time before they were ready to start drafting the required drawings. The professional tester took 2 hours to get to the same point.

Although all the testers were able to execute the three drawings with Generic CADD, they reported that the program's sparse facilities made the drafting difficult. Workarounds were found for unsupported tasks such as dashed circles (they broke arcs into smaller arc segments) or dimensioning (they created arrowheads and constructed dimension and witness lines from primitives). The complexity and extra steps of these workarounds, however, made it take much longer to finish each drawing.

The testers praised Generic CADD for its accuracy, its ability to precisely locate points through numeric keyboard input of coordinates and locations, and its symbol facility. But they disliked its text facilities (which cannot use Macintosh fonts), slow zooming, and lack of built-in plotter support.



Generic CADD Level 1 provides an interesting set of contrasts. It is extremely inexpensive and compact, fitting easily into nearly any Mac. Two configurations of Version 1.0 are supplied — one for the SE and Plus, the other for the Mac II (to take advantage of its floating-point processor). You can get right up to speed using pull-down menus, or you can use a two-letter shortcut command for nearly every feature. The program, however, lacks many basic CAD tools — particularly dimensioning — and needs to make better use of the Mac's existing graphics facilities.

For users on a limited budget, Generic CADD Level 1 version 1.0, at $99.95, serves a real purpose. By the time you read this, however, Generic Software will no longer distribute version 1.0 to its dealers. The newer version, 1.1 (tested in

TEST SCORES — From our student testers — Generic CADD

A — Best of Generic CADD 1
- **Break facility**
- **Manual entry using polar coordinates**
- **Numeric data-entry options**
- **Symbol facility**
- **Toolbox: simple, intuitive, quick**
- **Named views**
- **Plot points**
- **Print driver**

F — Worst of Generic CADD 1
- **Font choices supplied**
- **Grid snap (not consistent)**
- **Lack of plotter output**
- **Measure Area facility**
- **Lack of scroll bar**
- **Off-line Help file**
- **Page preview**
- **Slowness in zooming**
- **Text tool (no Mac fonts, etc.)**
- **Panning (clumsy)**

beta form by the Labs), sells for $149.95 and adds some new facilities. These include saving files as PICT or EPS, opening PICT files, translating for import/export to/from Generic's DOS version, new snaps (midpoint, object ,and intersection), select all, bulge-arc, and multiline text placement. It should be noted that even with these additions, Generic CADD is still spare in features when compared with the other products we tested.

Generic CADD Level 1 allows output on standard Mac printers. Before you can pen-plot with Generic, however, you need to purchase third-party plotter-driver software (such as MacPlot from Microspot), which will more than double your software costs.



Although the newer version can handle PICT files (for importing or exporting drawings from other Mac applications), Generic CADD Level 1's inability to use Mac fonts and fills makes it less attractive than the other products.

Generic's CADD Level 2 (to sell for $199.95) was announced in mid-1988 but was unavailable during our tests. Generic claims it will add such facilities as associative dimensioning, full color on a Mac II, arrowhead types, and many features missing in CADD Level 1. It won't add Mac fonts or fills, though. We'll have to wait and see how it performs.

DREAMS

Innovative Data Design (IDD) delivered its first product, MacDraft, in August 1985, beginning the era of 2-D Macintosh CAD. Now, more than four years and 65,000 copies of MacDraft later, we have the company's second-generation CAD product, DREAMS. Note that the term CAD is not a part of its name — a clear attempt by IDD to indicate the broader market this new product targets.

DREAMS was first announced to ship in July 1988. Delivery of DREAMS was delayed, however, and did not begin until the fourth quarter. A family of optional symbol libraries, an optional DXF and IGES file-conversion facility, and an optional pen-plotter driver were announced at the same time. As of this writing, a few of the promised symbol libraries were actually available.

IDD is aiming DREAMS at an audience wider than traditional CAD users. The company sees graphic designers, desktop publishing and presentations personnel, technical illustrators, interior designers, artists, and educators as prospective DREAMS users. To that end, the company has included facilities you don't normally find in any CAD product. One of these is the ability to design custom fill patterns on a 32-x-32-pixel array — in color, no less — and to save and store 255 of these patterns.

IDD has made a strong attempt to persuade its large base of registered MacDraft users to upgrade by offering them the $500 DREAMS product for $200. That should appeal to many MacDraft owners, and they won't be disappointed, because DREAMS provides many new capabilities.

TEST SCORES From our student testers **DREAMS**

A Best of DREAMS
- Documentation
- Fill-style editing
- Line-style editing
- Object-alignment tool
- Parallel-lines tool
- Pop-up menus
- Tutorials

F Worst of DREAMS
- Can't set scale, limited choices for scale
- Dimensioning
- Lack of keyboard data entry for positions and sizes
- No hatching
- No keyboard data entry
- Slow repaint
- Polyline tool
- Zoom choices too limited

What this product doesn't share with its more-expensive CAD cousins is training drudgery. Of the three products our testers worked with, DREAMS produced the shortest learning times. The student testers averaged only 1.7 hours, and our professional tester took 2 hours. Remember, we defined learning time as the time they spent studying the program, reading the manual (yes, some Mac users occasionally do that), and performing the tutorials to gain enough product familiarity to tackle the three test drawings.

DREAMS requires a hard disk, because the installed program occupies 851K. Installation is fast and simple. Although DREAMS can run on 1-megabyte systems, IDD recommends at least 2 megabytes of RAM if you want to use the program in color on a Mac II.

Our testers rated DREAMS the highest in ease of learning. They rated its documentation as better than Generic CADD's but not quite as good as Claris CAD's.

The DREAMS user interface is familiar in many ways. It contains the standard Mac menu bar and offers three relocatable palettes — Draft, Accessory, and



PHOTOGRAPHY: GEOFF NELSON

Left to right: Gary Mayeda, Mark S. Cohen, and Rushdi A. Ariss. They would like to see these additions to DREAMS:
- **Keyboard data entry**
- **Line breaking**
- **Predefined drawing specs**
- **Plotter output**
- **Polar coordinates**

Desktop Features

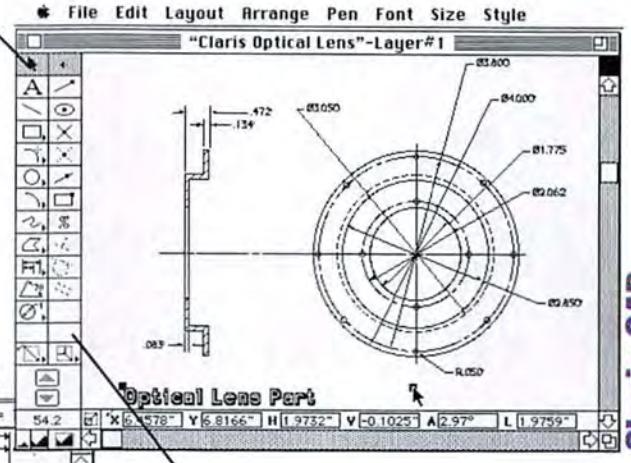
Tools:

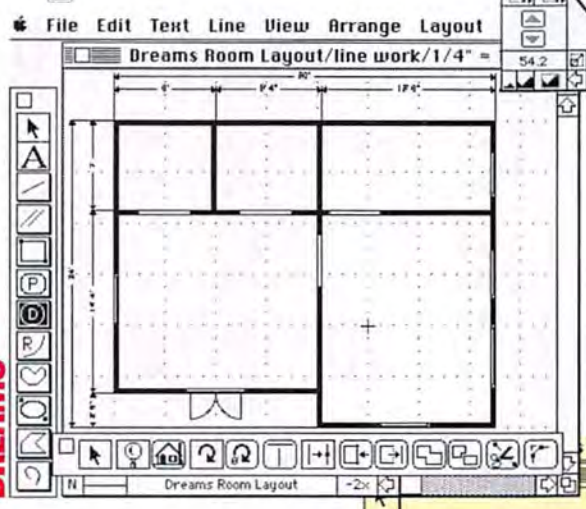
Generic CADD has multiple tools for two of its icons. The icons on Claris CAD's tool palette pop up to show 25 tools. DREAMS keeps tools on its tool palette (one per icon) and on its Accessory palette.



Construction Alternatives (Methods):

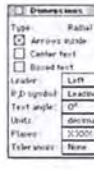
For most of its tools, Generic CADD provides one construction method. When you linger on a DREAMS tool icon or a Claris CAD Method icon, available methods pop up.





Placement Aids (Snaps or Modifiers):

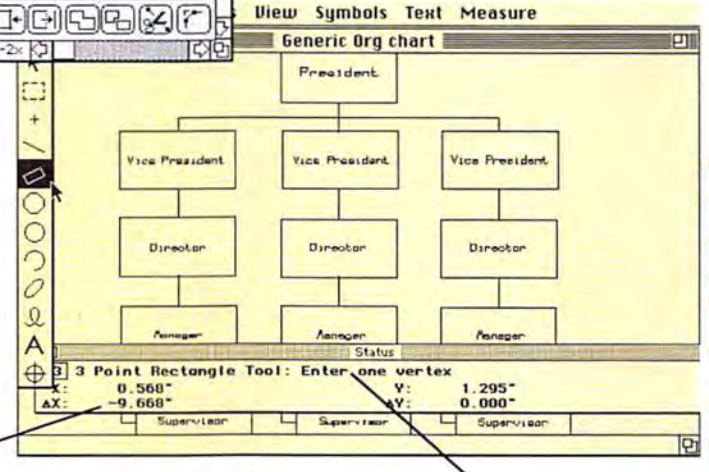
Of the three applications, Generic CADD offers the fewest placement aids, and Claris CAD the most. Claris CAD has positional modifiers, geometric constraint modifiers, and selection tool modifiers on a palette adjoining the basic tools palette. Equivalents to some of Claris CAD's modifiers can be found in DREAMS and Generic CADD, where they are enabled via pull-down menus.



Dimensioning:

DREAMS initiates dimensioning from a special palette. Claris CAD initiates dimensioning from its tool palette and lets you change appearance and content by using its dimension palette.

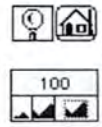




Location and Numeric Input :

Each product reads out cursor position in numeric coordinates. Claris CAD provides the most detail and lets you input data, using any of its readouts. DREAMS has no feature for keying in numeric data. Generic CADD allows absolute and relative keyboard entry, but only of coordinate pairs.

Panning and Zooming:



Generic CADD lacks auto-scroll and scroll bars. DREAMS has an icon to zoom home and one to zoom in or out. Claris CAD has icon boxes to zoom in, zoom out, zoom percentage, zoom area, or zoom home to the original view.

Prompting:

Generic CADD prompts the user with instructions for completing a command.

— Kevin Countryman

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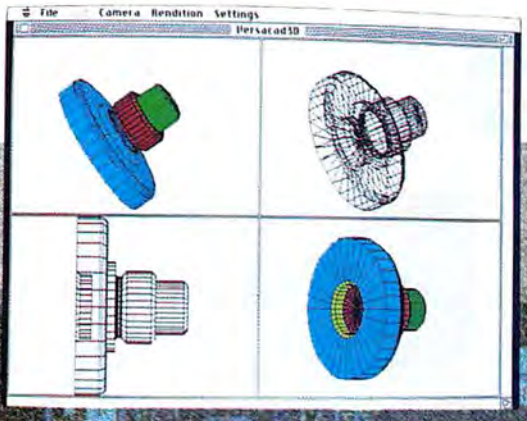
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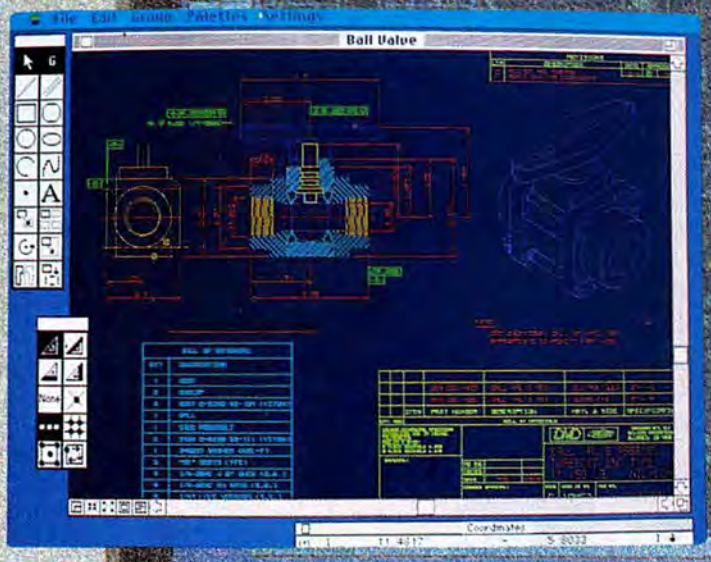
Looking into CAD?

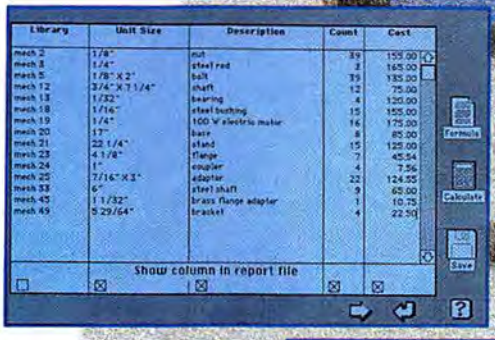
See how VersaCAD on the Macintosh stacks up . . .

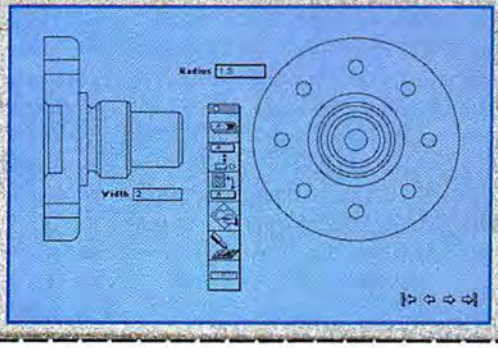
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PHOTOGRAPHY GEOFF NELSON

Left to right: Michael Bierman, Deron Maeda, Dan Martin, and Todd Marks. Their wish list for Claris CAD:
- **3-D capability**
- **Customized visible grid lines**
- **Dynamic dimensioning**
- **Function escape without dragging**

Dimension. The Draft palette has well-known tools for creating text, lines, and shapes. The Accessory palette has facilities for editing graphic objects and image-manipulation tools for zooming and panning. The Dimensions palette supports DREAMS' dimensioning facilities.



Two unique capabilities of the package are the ability to add objects to (or subtract them from) one another and to glue edges to objects or unglue them.

DREAMS is far more comprehensive than Generic CADD but not as feature-rich as Claris CAD. It is a vast improvement over MacDraft (see features chart) and will be well liked by Mac users, particularly those limited to a software purchase under $500.

When, at the end of the test, the student testers were asked which of the three products they would buy (with their own money, and at list price) one indicated Generic CADD, five selected Claris CAD, and the remaining five chose DREAMS. If we had included price in our other rating factors, DREAMS would likely have received a better rating. Compared with Claris CAD, DREAMS scored better per dollar of cost but measurably worse in an absolute sense.

Claris CAD

The third product in our affordable-CAD trilogy comes from Claris, a company known more for its best-selling horizontal applications than for CAD. Claris has the distinction of being the only CAD developer (on any computer platform) that also publishes a database program (FileMaker II), word processor (MacWrite), forms product (SmartForms), paint program (MacPaint), drawing/graphics product (MacDraw II), and a project-management product (MacProject II). Should the company find a way to integrate these disciplines into its CAD offering, Claris would be in an enviable position.

Claris gives many of its programs a distinct family look, which is good for people learning a new application. Claris CAD benefits from this consistency, sharing many icons, menus, dialog boxes, and other on-screen facilities with MacDraw II. It also shares a common pen-plotter facility with MacProject. Claris private-labels this version of MacPlot from Microspot and bundles it into each copy of Claris CAD, MacDraw II, and MacProject II.

It is tempting but inaccurate to think of Claris CAD as an overgrown and more expensive version of MacDraw II. Claris CAD is a high-quality, full-featured 2-D product that will satisfy any 2-D CAD professional. What separates Claris CAD from many of its higher-priced professional cousins is not a shortage of CAD features but the fact that you can learn it in a short time. Our student testers spent an average of 2.7 hours with it before starting the three test drawings, and our professional tester spent 3 hours.



A 45-minute, VHS-format videotape, "Claris CAD Tutorial," is included with every copy of Claris CAD. The tape provides a solid background for the capabilities and operation of the application. Also included are three manuals: a thick *User's Guide*, a *Tutorial Workbook*, and a *Getting Started* book. All are extremely well written, well organized, and profusely illustrated. In addition, Claris includes a durable ten-page *Quick Reference* to keep beside your Mac.

The software ships on three disks: Claris CAD, Claris CAD Utilities, and Claris CAD Tutorials. Claris CAD consumes a whopping 1,060K of your hard disk. As with DREAMS, a hard disk is required.

Although Claris CAD can run on a 1-megabyte system, you should plan on 2 megabytes or more if you plan to use color on a Mac II, if you have a large monitor, or if you use large drawing files. Performance speed improves measurably as you add RAM.

Claris uses a well-crafted interface design, consisting of components called tools, methods, and modifiers. Tools are the familiar icons for text, lines, rectangles, circles, and the like. Methods are facilities for using the tools and include such things as drawing from corner to corner and from center to edge. Modifiers are specific ways of handling the construction steps. Examples of modifiers are endpoint, center, corner, and tangent.

TEST SCORES — From our student testers — Claris CAD

A — Best of Claris CAD
- **Choice of drawing objects from either center or edge**
- **Choice of (numeric) keyboard or mouse drawing input**
- **Common-sense approach to many features**
- **Concentric-circles facility**
- **Concept of tools, methods, modifiers**
- **Dimensioning**
- **Information feature for each object**
- **Many choices of modifiers**
- **Modifiable object information**

F — Worst of Claris CAD
- **Join feature (doesn't work)**
- **No Help file**
- **Selection handles disappear if all lines in a four-line box are selected**
- **Sloppy grid control**

Using tools, modifiers, and methods is simple once you're familiar with the concept. To start, you select a tool, select which method you want to use with it, and finally select the proper modifier for each step. In this way, you learn a simple syntax that you can apply in 5,000 different combinations.



Within Claris CAD is a unique facility for drawing standards and specifications. It automatically supports all the major U.S. and international standards for dimensioning and annotation. Simply pick the one you want, and everything — including text-spacing and placement, metric and nonmetric units, and paper size — is automatically adjusted. In addition, you can edit them to create a standard that meets your needs.

Our testers gave Claris CAD the highest rating in nearly every category across the board. It produced the fastest times in nearly every performance test the Labs conducted. The ratings are offset by its higher price, however, which proves that you get what you pay for. At $799 (including plotter driver) it is the highest-priced product we tested but by far the most capable and powerful.



MacDraw II owners receive a $399 trade-up opportunity.

Despite its higher price, Claris CAD deserves careful examination. It offers more power but doesn't sacrifice ease of learning in the process. In this class of CAD product, it will be tough to beat.

David L. Peltz has been working in CAD since the days of bulky, colossally expensive display consoles. Nowadays, he is a CAD consultant for major corporations.

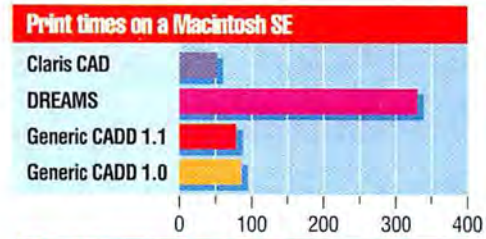
Speed of Performance (in seconds)

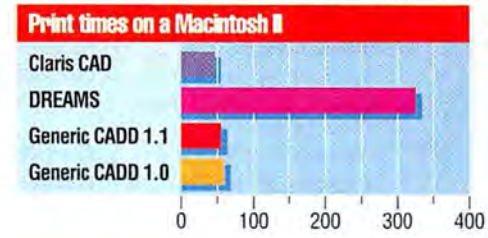


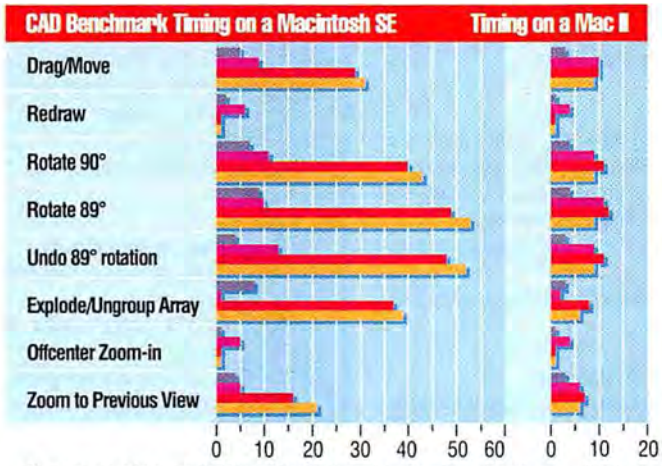
To determine performance differences among the three applications, MacUser Labs prepared an identical 500-object drawing on each application. We used the drawing to test each application's speed of performance for image redraw/manipulation and for timing Print functions. For primitives, we selected geometric shapes common to every 2-D CAD package and to typical CAD drawings. We chose the circle, square, and line.

Save and print test

Each of the three applications saved and printed test files from identical SE and Mac II platforms to a dedicated LaserWriter Plus. Although laser printers are less common than pen plotters in typical CAD use, MacUser Labs confined itself to laser-output performance because Claris was the only application that directly supported pen plotters.







Notes: Generic CADD uses double-precision floating-point arithmetic, so its performance improved enormously with the Mac II's coprocessor. DREAMS and Claris CAD use integer arithmetic; as a result, they were not dramatically faster on the Mac II than they were on the SE. On a Mac II, Generic CADD version 1.1 was slightly slower than Generic CADD version 1.0. This compromise in Mac II performance occurred when Generic CADD's programmers combined separate Plus/SE and Mac II applications into a single, platform-sensitive file that could run on a Mac II, Plus, or SE.

Functions related to redraw/manipulation

- Drag/move: drag the entire array diagonally one grid point away.
- Redraw after canceled dialog box: after opening the application's largest dialog box, time the redraw when it's canceled.
- Rotate the entire array 90 degrees: this test reflects calculation speed for the application's internal graphic manipulation.
- Further rotate array by 89 degrees: on some applications, this procedure requires more time than does a 90-degree rotation since sines and cosines may need to be calculated.
- Undo 89-degree rotation: depending on how rotations are calculated internally, the Undo could take as much as or less time than the 89-degree rotation.
- Explode/ungroup array: how long it takes to disassemble a large entity so parts of it can be modified.
- Zoom in on an off-center element of an ungrouped array: zooming is the most common CAD operation.
- Zoom back out to previous view: this function requires more calculations than a zoom in because the zoomed-out image it regenerates is more complex.

Summary of CAD Features

	Generic CADD Level 1	Generic CADD Level 1 (beta)	IDD MacDraft	IDD DREAMS	Claris MacDraw II	Claris Claris CAD	VersaCAD Drafter
General							
List price	$99.95*	$149.95	$269	$500	$399	$799	$995
Version	1.0.1*	1.1b6	1.2b	1.0	1.0	1.0	2.10
Runs on Mac Plus, SE, II, and IIx	yes	yes	yes	yes	yes	yes	yes
Separate versions for Plus/SE and II/IIx	yes	no	no	no	no	no	yes
Fits in 1-Mb system	yes	yes	yes	yes	yes	yes	yes
Requires a hard drive	no	no	no	yes	no	yes	yes
No. of layers	256	256	1	unlimited†	unlimited†	unlimited†	250
No. of on-screen colors (on Mac II)	2	2	2	256	8	8	256
No. of drawings open simultaneously	unlimited†	unlimited†	4	4	7	7	1
Recovers file after a system crash	no	no	no	no	no	no	yes
Database							
Type of database	2-D	2-D	2-D	2-D	2-D	2-D	2.5-D
Double-precision integer	no	no	yes	yes	yes	yes	no
Floating point	yes	yes	no	no	no	no	no
Double-precision floating point	yes	yes	no	no	no	no	yes

*Generic is no longer distributing version 1.0 to dealers.
†Unlimited means limited only by memory.

General:



Number of layers
Separate design functions are kept on separate layers, which can be shown or hidden. A facilities manager, for example, may view cubicle walls while suppressing views of the furniture and electrical system.

Database:



Types of databases
Think of graphic information stored in a 2-D database as simple x and y values. A 2.5-D (or pseudo–3-D) CAD application can add z values to its database. Some 2.5-D applications can display the design in 3-D views. In a true 3-D application, the x, y, and z coordinates in the database let you produce cross-sectional views, shape complex surfaces, and produce high-quality shaded renderings.

Double-precision integer
Floating point
Double-precision floating point
Only the most exacting applications require the accuracy of double precision. Performance speed on a Macintosh without a coprocessor is comparatively slow for double-precision floating-point operations (64 bits or more). Macs with coprocessors (the Mac II, the '030-based Macs, and earlier Macintoshes with add-on coprocessors) can work in double precision without this performance speed penalty.

Geometric construction:

Chamfer
On a 3-D object, a chamfer is a beveled or sloping edge. To chamfer in 2-D drafting, join or chop two lines (usually perpendicular) by a third line at a given angle and length (or specified offset from the corner).

Fillet



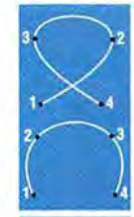
A rounded interior corner is a fillet. A rounded exterior corner is properly called a round, but computer-aided design terminology considers both types fillets. In 2-D design, a fillet is an arc of a specified radius connecting two lines tangentially at its endpoints.



Double line
These are simultaneously drawn parallel lines. When drawn two at a time, they are especially useful for drawing walls or piping. Some applications can draw more than two at a time.



Bezier curves
Defined by a mathematical function, Bezier curves are constructed by four or more points: two at the endpoints and the rest acting as off-line control points or handles determining the curve's shape.



Spline curves
Named after an old-fashioned flexible drafting ruler, CAD splines are defined by a polynomial. Spline curves pass through each of the points specified by the drafter.



Ways to draw circles
Three of the ways to define a circle are
- Center and one point on the circumference.
- Both diameter endpoints.
- Three points on the circumference.



Ways to draw lines
Lines are usually constructed in one of two ways: from one endpoint to the other or from midpoint to one end.

Summary of CAD Features

	Generic CADD Level 1	Generic CADD Level 1 (beta)	IDD MacDraft	IDD DREAMS	Claris MacDraw II	Claris Claris CAD	VersaCAD Drafter
Geometric construction							
Numeric input from keyboard	yes	yes	no	no	no	yes	yes
Chamfer	no	no	no	no	no	yes	yes
Fillet	no	no	no	yes	no	yes	yes
Double line (max. no. simultaneously)	no	no	no	yes (2)	no	yes (2)	yes (256)
Bezier curves	yes	yes	no	yes	no	no	yes
Spline curves	yes	yes	no	yes	no	yes	yes
No. of ways to draw circles	1	2	2	3	2	4	2
No. of ways to draw lines	2	2	1	1	2	3	1
Dashing for lines, circles, and arcs	no	no	yes	yes	lines only	yes	yes
Dashing for squares and rectangles	no	no	yes	yes	yes	no	yes
Dashing for path-type curves	no	no	polygon	Bezier, spline	no	no	no
Snaps (or modifiers)							
To nearest point or object	yes	yes	no	no	no	yes	yes
To an endpoint	yes	yes	no	yes	no	yes	yes
To a circle/arc center	yes	yes	no	yes	no	yes	yes
To a midpoint	no	yes	no	no	no	yes	yes
To an invisible intersection	no	no	no	via extend	no	yes	via extend
To a percentage of linear distance	no	no	no	no	no	yes	no
To a percentage of arc distance	no	no	no	no	no	yes	12.5% incr.
To a grid point	yes	yes	yes	yes	yes	yes	yes
To a perpendicular	no	no	no	no	no	yes	yes
To a tangent	no	no	no	no	no	yes	yes
As an offset	no	no	no	no	no	yes	yes

Snaps (or modifiers):

Newly drawn objects must frequently be connected to a preexisting object at some exact vertex, datum, or other defined point. With snaps, these connections are easy to draft. Without snaps, making these connections is tedious and often imprecise.



Snaps to an endpoint
When the endpoint snap is enabled, the construction point of an object being drawn snaps precisely to the nearest endpoint of the line or arc already in place.



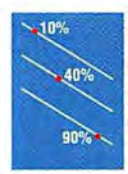
Snaps to a circle/arc center
Enabling this snap lets the construction point of a newly drawn object be positioned at the center of an arc or circle already in place.



Snaps to a midpoint
Enabling this snap lets the construction point of a newly drawn object be positioned at the midpoint of a linear segment already in place.



Snaps to an invisible intersection
Selecting this snap and two nonparallel lines or segments lets a newly drawn object be connected to the projected vertex of the two lines or segments.



Snaps to a % of linear distance
Selecting this snap and keying in a percentage lets a newly drawn object be positioned along a given line by the percentage distance from the line's beginning to its end.



Snaps to a % of arc distance
Lets a newly drawn object be positioned along a given arc by the percentage distance from the arc's beginning to its end.



Snaps to a gridpoint
Enabling grid snaps forces an object being drawn to position itself only on the nearest gridpoint, whether or not the gridpoints are visible on the screen.



Snaps to a perpendicular
When this snap is selected, any lines drawn are aligned perpendicularly to the nearest face or tangent of an existing object.



Snaps to a tangent
When this snap is selected, new lines are drawn tangentially to preexisting circular objects, and new circular objects are drawn tangentially to preexisting linear or circular objects.



Snaps as an offset
If offsets are enabled, a newly drawn object is constrained to be parallel to or concentric with an original object.

Enter The New Age of Electronic CAD



The wait is over for a powerful, easy to use electronic design workstation.

With the new Douglas CAD/CAM Professional System, you can now experience computer-aided design without going over budget and without sitting through months of tedious training. Running on the Apple Macintosh Plus, SE and II, the Professional System from Douglas Electronics excels in price/performance, short learning curves and ease of use.

As the newest addition to the Douglas CAD/CAM line of printed circuit board design and manufacturing systems, the Professional System is a fully integrated engineering tool that will take you from the schematic drawing to the final routed board. The software features full color, unlimited multi-layers and .001" control which makes surface mount technology (SMT) and other difficult tasks a snap. Professional Layout includes a parts placement facility. Schematic includes fully interactive digital simulation and net list generation. A flexible, multi-pass router completes the design cycle with a 16 layer routing capability.

The new age of electronic CAD has come with the high resolution and speed of a Macintosh engineering workstation. You'll be designing your first circuit board just minutes after the Professional System software has been loaded into your computer. In addition, the Macintosh's graphics capabilities allow for powerful features such as the ability to transfer Professional System drawings into final engineering documentation.

Computer-aided design wasn't meant to be time consuming and complicated. If your present CAD system has got the best of you, it may be time you enter the new age of electronic CAD with the powerful, easy to use Douglas CAD/CAM Professional System.

Take your first step by ordering a full-feature Demo. All three programs are included for just $25.

Call or write for more information and to place your order.

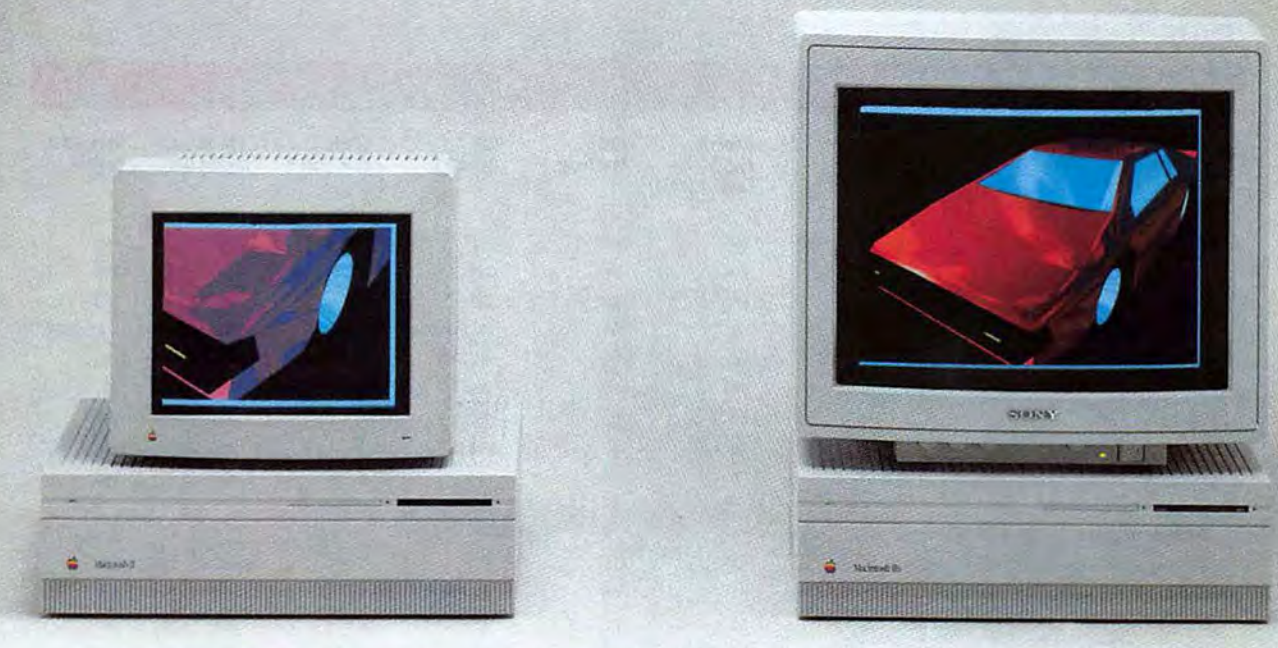
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Whether you're designing the next generation of a product or drafting the plans for a new building, you need to keep the whole project in mind. And now you can keep it in view as well, thanks to the Truevision HR Graphics card. The HR card lets your Mac® II display a sharp 1280 x 960 pixel image, 400% more than a standard Apple® monitor and 56% more than other 'high resolution' 1024 x 768 displays. Its 256 colors (from a 16.7 million color palette) give you tremendous flexibility for engineering drawings, scientific visualizations, or 3D modeling for prototypes. And the HR supports a virtual desktop up to 2048 x 2048 pixels, allowing you to pan over large drawings in real-time, horizontally and vertically.

The HR card is QuickDraw™ compatible*, which means that you can run with virtually all Macintosh® software. And you may select the monitor of your choice from manufacturers like JVC, Philips and SONY®. There are two Truevision HR cards available: the HR 2M ($3995) addresses a virtual desktop of up to 2048 x 1024 pixels, and the HR 4M ($5995) addresses up to 2048 x 2048 pixels. Get precise images and view large format drawings with the Truevision HR Graphics card. Take a test drive soon by visiting your Authorized Truevision Reseller, or call us at **800/858-TRUE** for more information.



The HR Graphics Card works with the Macintosh II, IIx and IIcx.

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Unretouched screen displays of an Apple RGB monitor at 640 x 480 and an HR-compatible monitor displaying the same image at 1280 x 960 pixel resolution.

*All graphics cards with more than 1MByte of memory require 32-bit QuickDraw. QuickDraw is a trademark and Apple, Macintosh and Mac are registered trademarks of Apple Computer, Inc. SONY is a registered trademark of Sony Corporation of America. Image courtesy of Electric Image. PageMaker is a registered trademark of ALDUS Corp. AutoCAD is a registered trademark of AutoDesk Inc.

Summary of CAD Features

	Generic CADD Level 1	Generic CADD Level 1 (beta)	IDD MacDraft	IDD DREAMS	Claris MacDraw II	Claris Claris CAD	VersaCAD Drafter
Editing							
Align and distribute objects	no	no	yes	yes	yes	yes	no
Mirror and scale an object	yes	yes	yes	yes	no	yes	yes
Rotate an object	yes	yes	yes	yes	yes	yes	yes
Locate an x,y point by projection of lines	no	no	no	via extend	no	yes	via extend
Divide (break)	yes	yes	no	via trim	no	yes	yes
Trim	yes	yes	no	yes	no	yes	yes
Extend	no	no	no	yes	no	yes	yes
Boolean add/subtract objects	no	no	no	yes	no	no	no
Duplicate (rectangular and circular)	no	no	no	no	no	yes	yes
Dimensions							
Marker (arrowhead-type) options	none	none	1	10	2	6	6
User control of marker size and shape	no	no	no	via symbol	yes	yes	no
Linear dim.: single, chaining, and baseline	no	no	pt. to pt.	yes[§]	no	yes	yes
Angular dimensioning	no	no	no	no	no	yes	yes
Radial and diametral dimensioning	no	no	no	no	no	yes	yes
Circle center symbol	no	no	no	no	no	yes	no
Units (English and metric)	yes	yes	yes	yes	yes	yes	yes
Fractional display with base control	no	no	yes	yes	no	yes	yes
Text above, below, inside dim. line	no	no	yes	yes	no	yes	yes
Tolerancing control	no	no	no	no	no	yes	yes
Leader control	no	no	no	no	no	yes	yes

[§]DREAMS' linear dimensioning is associative — that is, the dimensioning lines and text update automatically when their object is reshaped.

Editing:





Align and distribute objects
Aligning objects is like justifying text. Typically, text can be justified only right, left, and center. Objects, however, can be aligned top and bottom. Objects sometimes need to be distributed along a user-designated line. Different spacing criteria can apply: object centers can be evenly spaced along the distribution line, a specified boundary on the objects can be evenly spaced along the distribution line, or the objects can be placed along the distribution line so that the spaces between their boundaries are equal.

Locate an x,y point by projection
This feature locates the projected intersection of two lines designated by the drafter. It then records the point's x,y location in the database as an object.



Divide (break)
A Divide partitions a single object into two or more separate ones.

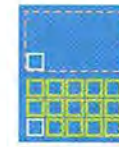


Trim
If a portion of a drawing element extends past an intersection with another drawing element, the Trim function can lop it off at the intersection.

Extend
The Extend feature is the opposite of Trim; it lengthens an arc or line to a specified point (or by a given amount).



Boolean add/subtract objects
The Add feature merges two objects. The Subtract feature allows a top object to cut out the underlying portion of another object in cookie-cutter fashion.





Rectangular and circular duplication
Rectangular duplication makes it easy to create an array from an original element of the array. Circular (or polar) duplication generates a circle or partial circle of elements from an original element. Some applications allow elements to be rotated as they are revolved, which is especially useful for drafting machine parts.

Dimensions:



Linear dimensioning single, chaining, and baseline (datum)
These features let you properly dimension distances by indicating beginning and end points. Base-line dimensioning is used where accumulated tolerance errors must be avoided when fabricating actual parts.

Summary of CAD Features

	Generic CADD Level 1	Generic CADD Level 1 (beta)	IDD MacDraft	IDD DREAMS	Claris MacDraw II	Claris Claris CAD	VersaCAD Drafter
Text annotation							
Stroke fonts	yes	yes	yes	yes	yes	yes	yes
Macintosh fonts	no	no	yes	yes	yes	yes	yes
Rotatable text	yes	yes	90° only	yes	yes	yes	yes
Mixed sizes, styles in text block	no	no	no	yes	yes	yes	no
Enter text directly on drawing	no	no	yes	yes	yes	yes	no
Right, left, center justification	no	no	yes	yes	yes	yes	left only
Drawing configuration control							
Scales (preset, user-defined)	1 custom	1 custom	32 fixed	44 fixed	yes	256 custom	1 custom
User-definable dashing patterns	none	none	none	15 custom	6 custom	256 custom	8 fixed
Matrix for user-definable fill patterns	none	none	8 x 8	32 x 32*	8 x 8	8 x 8	none
Custom hatching	no	no	no	no	no	yes	yes
ANSI, ISO, DIN, JIS, BS, custom spec. presets	no	no	no	no	no	yes	no
Save and reuse all settings and preferences	yes	yes	no	yes	yes	yes	yes

*DREAMS is limited to 8 x 8 fills on a monochrome monitor; otherwise it can do 16 x 16 or 32 x 32.



Angular dimensioning
Angular dimensioning measures angles. It is crucial in mechanical drafting and useful in other drafting disciplines.



Radial and diametral dimensioning
These features are needed frequently by mechanical drafters.



Circle-center symbol
This is a time-saving drawing aid that is sometimes included in a symbol library.



Fractional display with base control
Architectural and structural designers conventionally annotate their work in fractions of an inch rather than decimals. Since they use fractional grid spacing, their dimension text and location readouts should be expressed as fixed-base fractions, not decimals. Rather than showing up as 0.0625" and 0.1250", for example, text should read 1/16" and 1/8" (or 2/16").

Text above, below, inside dimension line
Architectural and structural drawings frequently show dimension text above the dimension lines. Depending on which specification is being followed, machine drawings often place text inside a broken dimension line. Text below the line is uncommon.



Leader control
A leader is a thin solid line going from a note or dimension to a marker (arrowhead or dot).



Tolerancing control
Tolerance is the amount of variation permitted in the size of a part or the location of points. Narrow tolerances increase the precision and expense of fabrication. Tolerancing control lets the drafter select how the drawing shows tolerances.

Text annotation:

Stroke fonts
Stroke fonts became a text standard in technical drawing because they could be drawn quickly on pen plotters.

Macintosh fonts
Although Macintosh fonts are not traditional to technical drawing, some people consider them more attractive than stroke fonts. Mac fonts have another advantage; they do not additionally burden the memory and storage of an object-based Macintosh CAD system.

Enter text directly on drawing
Direct text entry is much easier than going back to a dialog box each time you need to adjust the layout of text.

Configuration controls:

Scales (preset, user-defined)
Scale is the ratio of a real-world object's size to the size that represents it on a drawing. Different disciplines use different scales in their drawings.



Custom hatching
Hatching a cross-sectional view defines the type of material to be used in a part. To distinguish adjoining parts, hatches are sometimes mirrored. Many of today's hatch patterns became technical-drawing standards long before CAD. As new materials come into use, so do new custom hatch patterns

ANSI, ISO, DIN, JIS, BS, and custom specification presets
Engineering disciplines adhere to standard drafting conventions. These five standards establish drawing sizes, rulers, dimensioning markers, and symbols in different parts of the world.

Save and reuse all settings and preferences
This function lets a user customize a drafting environment for later drawings. Each time the application is launched anew, the presets conform to user preferences.

Summary of CAD Features

	Generic CADD Level 1	Generic CADD Level 1 (beta)	IDD MacDraft	IDD DREAMS	Claris MacDraw II	Claris Claris CAD	VersaCAD Drafter
Drawing productivity tools							
Customizable viewports	yes	yes	no	yes	yes	yes	no
Area and distance calculations	yes	yes	yes	yes	no	yes	yes
Perimeter calculations	no	no	no	no	no	yes	yes
Join and unjoin (smash) objects	yes	yes	no	yes	no	yes	yes
Hierarchical grouping	yes	yes	yes	yes	yes	yes	yes
Nested symbols	yes	yes	yes	yes	yes	yes	yes
Symbol libraries available	optional	optional	3rd party	optional	3rd party	3rd party	optional
Symbol rotate and scaling	yes	yes	yes	yes	no	yes	yes
Zoom	yes	yes	by 2x incr.	by 2x incr.	yes	yes	yes
Window-zoom marquee-defined area	yes	yes	no	no	no	yes	yes
Selection by object type	no	no	yes	yes	yes	yes	yes
Selection by layer	yes	yes	no	yes	yes	yes	yes
Isometric projections	no	no	no	no	no	no	yes
Output and import/export							
Import/export IGES	no	no	no	planned	planned	planned	via upgrade
DXF (to/from AutoCAD)	no	no	no	planned	planned	planned	via upgrade
To/from same product on DOS platforms	no	yes	no	no	no	yes	no
To/from same product on UNIX platforms	no	no	no	no	no	no	yes
Import/export PICT	export	yes	yes	yes	yes	yes	yes
LaserWriter support	yes	yes	yes	yes[1]	yes	yes	yes
Pen-plotter support	3rd party	3rd party	3rd party	optional	yes	yes	yes
ImageWriter support	yes	yes	yes	yes	yes	yes	yes

[1]DREAMS supports PostScript images on the LaserWriter. This gives DREAMS internal control over printer resolutions greater than 72 dpi.

Drawing productivity tools:

Customizable viewports

A particular aspect of a drawing can be viewed separately without repetition of multiple zooms and pans.

Area, distance, and perimeter calculations

Calculations of area, distance, and perimeter are convenient preliminaries to follow-on design functions (such as stress/strain analyses or cost estimates).

Join and unjoin (smash) objects

Some Macintosh graphic objects (rectangles, for instance) can be smashed to more elemental primitives such as lines.



Hierarchical grouping

Primitives, objects, and entities are more elemental components of a drawing (although different CAD applications do not agree on terminology). Group functions assemble elemental entries in the drawing database (temporarily or permanently) into an encompassing group. Ungroup functions disassemble the group into components. Groups can be nested into even-higher-level groups.

Nested symbols

Unlike groups, symbols can be given a name and usually stored in a separate file called a library. Some applications let higher-level symbols be created by nesting lower-level symbols.

Symbol libraries available

CAD suppliers and third-party vendors offer a variety of symbol libraries for specific disciplines such as architecture, electronics, or landscaping.

Symbol rotation and scaling

A symbol library of stock drawing parts for a particular discipline usually lets the designer size, mirror, rotate, and place frequently used symbols without drafting them from scratch.

Isometric projections

Isometric projections show an object's three principal axes foreshortened equally. The three center lines depicting an isometric view of a



cube, for example, are the same length and define three equal angles where they meet. With such an isometric view, the designer can visualize the parts being drawn more easily than with 2-D projections.

Output and import/export:

Import/export IGES

The Initial Graphics Exchange Specification (IGES) is an ANSI-standard neutral (nonproprietary) format for CAD files. It is common among workstation-, minicomputer-, and mainframe-based CAD applications.

Laser-printer support

Traditional CAD drawings have to conform to size regulations when finished and sent out (to a construction site or a government agency, for example). LaserWriter hard copy is too small to conform to these regulations. But for many design purposes, laser-printer output on standard sheets is conveniently sized and adequately precise (provided the application's LaserWriter driver is well written).

—Kevin Countryman

Executive Summary

MacUser Labs examined three mass-distribution 2-D CAD products: Generic CADD Level I, DREAMS from IDD, and Claris CAD. Twelve Mac-smart testers evaluated the three products under non-laboratory conditions. They found they could produce actual drawings with all the products after a few hours. They examined each product for ease of learning and use, and for quality of documentation. They rated Claris CAD the highest in nearly every category, with DREAMS second and Generic CADD Level 1 third.

Generic CADD Level 1, version 1.0 costs $99.95, and version 1.1 costs $149.95; DREAMS costs $500; Claris CAD costs $799. DREAMS offers more power and better performance than Generic CADD but falls short of Claris CAD in both of these respects.

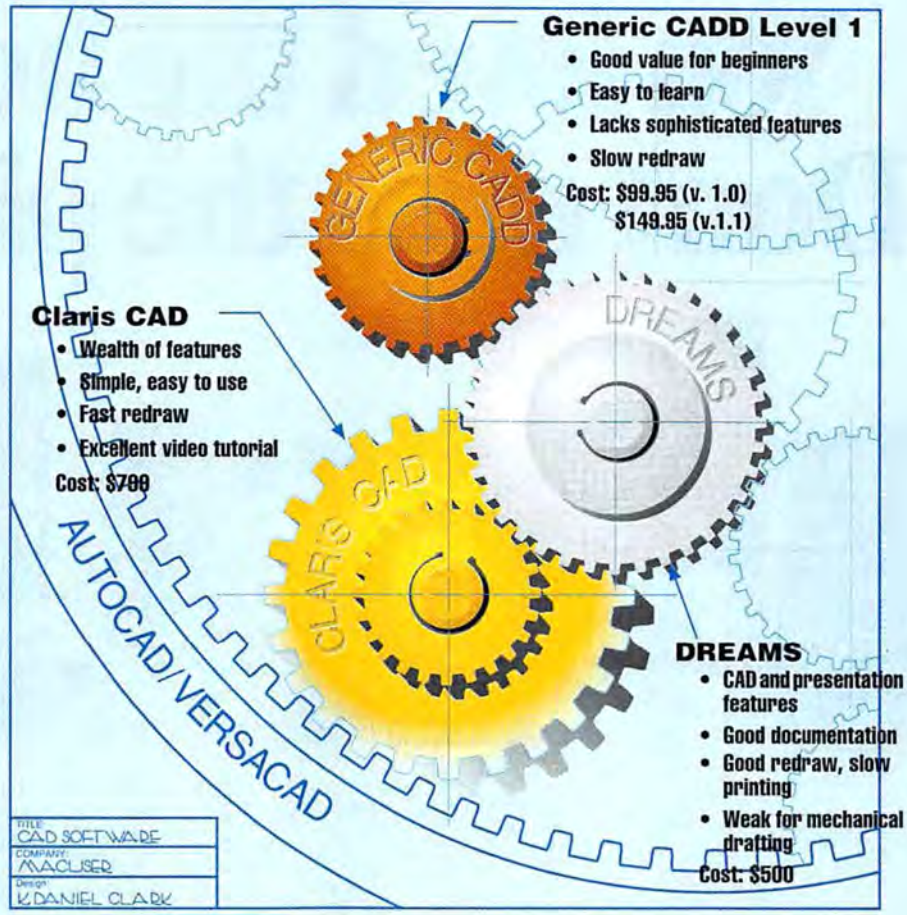


ILLUSTRATION K. DANIEL CLARK

Generic CADD Level 1

Capability: Generic CADD 1.0 is a good value for beginners or casual drafters. It lacks many time-saving features necessary for serious drafting. Version 1.1 is slightly better equipped, however. Generic CADD's interface is not very Mac-like. *Performance speed:* Complex drawings make Generic CADD run very slowly unless you use a Mac II or coprocessor. *Ease of learning:* Generic CADD's HyperCard tutorial, user manual, and prompting feature make it easy to learn.

DREAMS

Capability: In addition to its respectable CAD abilities, DREAMS has color features that suit it to graphics presentations and conceptual design. Though DREAMS easily handles architectural drawings, its lack of certain time-saving CAD features makes it less desirable for mechanical drafting. *Performance speed:* Good, but printing is very slow. (IDD is aware of the problem.) *Ease of learning:* Its Mac-like interface helps those familiar with Macintosh draw programs get started. A well-written user manual makes it easy to learn its CAD-specific features.

Claris CAD

Capability: Claris CAD has a wealth of features yet is extremely easy to use. It is as good as or better than any Macintosh CAD application for 2-D drafting. *Performance speed:* Very fast, thanks to efficient redraw. *Ease of learning:* Its well-organized palettes, excellent video and tutorials, and predictable command syntax make Claris CAD a joy to learn. On-line help is missing, however.

Kudos

Kudos to our advisory-panel members: Ted Peters and Lisa Saunders of Generic Software, Bruce N. Lee of IDD, and Craig Young and Kyle Mashima of C.A.S.E. Thanks also to our testers: Joe Lewis of General Lift and the students at Cal State University, Northridge.

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DTP

BETWEEN THE LINES

■ Edited by
Aileen Abernathy and
Salvatore Parascandolo

The spring Seybold Seminar was a hotbed of DTP fact and friction. Check out news and product introductions in Fine Print. We put PhotoMac, a color-image retouching program, through its paces in Desktop Reviews, along with newcomers KeyMaster and FontLiner. If you've ever had your fonts switched from screen to print, read "Fonts by Number" for some tips.

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If you have a few tricks of the trade to share, send 'em to DTP, c/o *MacUser*
950 Tower Lane
18th Floor
Foster City, CA 94404.

Apple Readies New Color Technologies

Color is currently the most quickly evolving area of DTP. Supporting this evolution, Apple is finalizing its full-color System software, 32-bit Color QuickDraw. It's a beauty — fast and smart. It can display full-color PICT2 images on systems capable of handling them, and it also works in 16-bit (6,556 colors), 8-bit (256 colors), 4-bit, and 1-bit modes. For the latter three modes, the new QuickDraw does an admirable job of automatic dithering to produce the illusion of more colors. Gray-scale representation of color images has also been enhanced. Following Color QuickDraw's official debut later this year, third-party applications that have been awaiting its appearance should quickly be released.

Apple has also completed its new LaserWriter driver (6.0), which outputs full-color PostScript. It prints lifelike 24-bit color PICT2 images with smooth transitions between tones. On monochrome laser printers, it renders color and gray-scale PICT2 images as halftones instead of in high-contrast black and white. These features should help desktop publishers produce much better comprehensives and final masters, and should make PICT2 files more appealing as a general interchange medium on the Mac. The new driver is also faster at determining what fonts are available in the target printer and which fonts to download. The new 32-bit QuickDraw and LaserWriter driver will be covered in depth in upcoming issues.

■ **Salvatore Parascandolo**

Book Nook

Several impressive, new DTP-related books have crossed our desks recently. One of the best is *The Macintosh Font Book* ($23.95) by Erfert Fenton. This comprehensive guide to Mac typography includes terminology, typeface selection, usage tips, utilities, and a buyer's guide. It's available from Peachpit Press, 1085 Keith Ave., Berkeley, CA 94708; (415) 526-8555.

The Scanner Book covers desktop scanners for Macs and PCs. Authors Stephen Beale and James Cavuoto discuss applications, software capabilities for halftones and optical character recognition (OCR), and, of course, the scanners themselves. The $22.95 book includes numerous illustrations, tips, and a buyer's guide. Get your copy from micro-Publishing Press, 21150 Hawthorne Blvd., Suite 104, Torrance, CA 90503; (213) 371-5787.

■ **Aileen Abernathy**

Clippings

Letraset, bowing to overwhelming user opprobrium, has removed copy protection from LetraFonts, the type library used with LetraStudio. The unprotected fonts are simple to install and don't preclude the optimization of hard disks. All registered users should receive a new set of unprotected fonts, plus instructions on how to swap LetraFonts purchased separately. For more information, contact Letraset USA, 40 Eisenhower Drive, Paramus, NJ 07653; (201) 845-6100.

Adobe has developed new halftone screen angles that minimize the problem of moiré in four-color separations done with PostScript interpreters. The company has created new PostScript Printer Description (PPD) files with a set of halftone screen values for each printer resolution and screen frequency. For more information, contact Adobe Systems, P.O. Box 7900, Mountain View, CA 94039; (415) 961-4400.

Professional Tools of the Trade

QuarkXPress™ electronic publishing software is a complete publication design and production environment. It combines all the tools you need to create truly professional-quality publications on the desktop.

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The gap between DTP and high-end systems is closing fast. At Seybold Seminars '89, the focus was on color, fonts, and prepress links to the Mac.

The Desktop Grows

Publishing on the Macintosh has matured from a one-desktop, paper-output operation to a multiuser, multioutput production environment. Seybold Seminars '89 in San Francisco showcased the latest developments, including new color applications, advances in font technology, and more PostScript-clone imagesetters. New links to specialized prepress systems will extend the power of the Macintosh and provide low-cost workstations for high-end systems.

Color publishing is being bolstered with new input and storage devices and sophisticated color-handling software. Letraset USA will release its ColorStudio photo-editing software sometime this summer. ColorStudio can do full-color editing of both 8- and 24-bit images, either scanned or captured with video input boards. It can incorporate high-quality text, perform color separations, or send images to a video-output device.



PageMaker's in the pink, thanks to Aldus' new $195 Color Extension, which can display 24-bit TIFF images on-screen. Four-color separations of PageMaker files can be performed with CE Separator, which is developed by Pre-Press Technologies and included with the Color Extension.

Aldus formally introduced PageMaker Color Extension (see Between the Lines, May '89) and announced the Open Prepress Interface (OPI), which would standardize how TIFF information is encoded in PostScript files. If OPI becomes the standard, any prepress system could color-separate any desktop-published document that conforms with OPI. Prepress vendors like Crosfield, Diadem, and Pre-Press Technologies have endorsed OPI, which defines coding for the color, sizing, cropping, and positioning of TIFF images.

On the hardware side, Microtek showed its compact 300-dot-per-inch, 24-bit color scanner, which also scans in 8-bit gray scale. It will sell for under $4,000 and include a retouching and separation program. Two vendors, Storage Dimensions and MACsetra Technologies, were demonstrating high-capacity, 600-megabyte read/write optical drives. Such drives will be necessary for economical storage of high-resolution, full-color images.

Font Frenzy

The font wars took a surprise turn. Six months ago, at the last Seybold show, it was Adobe against the world. This time around, the lion lay down with the lambs. The availability of high-quality PostScript typefaces should increase dramatically in the wake of Adobe's announcement that it is at last licensing its font technology.

The initial licensees — AGFA Compugraphic, Monotype, and Varityper — will use Adobe's proprietary encryption and font-hinting techniques to create their own downloadable PostScript typefaces. The resulting fonts will produce high-quality output on Adobe PostScript interpreters, even at small point sizes and low resolutions. Until now, Adobe and Linotype have been the only sources of PostScript typefaces that are fully compatible with Adobe's PostScript interpreters. On the hardware side, Adobe revealed that Canon, the leading manufacturer of engines for laser printers, has licensed the Adobe PostScript interpreter.

Adobe also introduced a new line of typefaces called Adobe Originals, which are designed to meet the needs of professional typographers. The faces come in three weights with matching italics, have expanded kerning tables, and contain characters normally missing from digital typefaces such as small capitals, fractions, and ligatures. The first Originals releases are Adobe Garamond and Utopia.

Clones Crack the Code

All the hoo-ha about Adobe's celebrated font encryption and hinting technology is fast becoming a moot point. First Bitstream and now Raster Image Processing Systems (RIPS) have announced the cracking of Adobe's code; other clone makers are expected to make similar announcements soon.

For RIPS, this means its clone PostScript interpreter will handle Adobe's font hints, which improve type appearance at low resolutions and small point sizes. RIPS demonstrated its Image 4000 controller using Adobe fonts; the interpreter can also handle hinted fonts from Bitstream and URW.

Birmy Graphics finally shipped its long-delayed PostScript-clone imagesetters, the BirmySetter 300 and 400, which use the RIPS controller. At least four other companies — Digital Technology International, Optronics, Pre-Press Technologies, and Chelgraph — announced PostScript-clone image-setters with prices ranging from $26,000 to $135,000.

As for "real" PostScript interpreters, Linotype introduced a new PostScript controller for its Linotronic imagesetters. The $26,000 RIP III is based on the 68030 chip, giving it a speed boost of 80 percent for graphics and 20 percent for text processing. The new RIP uses the same Atlas interpreter as previous RIPs,

By Salvatore Parascandolo and Aileen Abernathy

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but it includes 8 megabytes of RAM, a 135-megabyte hard disk, and an Ethernet option.

Best of the Rest

Regularly producing an ever-changing directory or catalog is a grueling task with an ordinary DTP program. Enter HyperPublisher — not a HyperCard product, but a powerful and flexible database publisher that automates the layout of information (words and pictures) normally stored and used as a database. It's both a full-fledged page design tool and a multifield database manager equipped with a programming language that can help you make intelligent layout decisions on the fly. All existing database programs (File, FileMaker, 4th Dimension, and so on) can print their records in a variety of ways, but none offers flexibility and true and simple DTP-grade control over the output. Similarly, with all the power that dedicated DTP programs have, none can boast of effective handling of database material. HyperPublisher can store images in various formats and produce four-color separations of each page.

It can also access external databases through a Standard Query Language (SQL) interface. Changes to records can be made in the database view or on the layout itself, with a choice of affecting or not affecting the actual data. It can also generate an index based on the contents of any field in the database. At Seybold, HyperPublisher was in search of a software publisher, which it should have little difficulty finding. Expect imitations of this breakthrough product to begin popping up in a year or two. HyperPublisher's developer is CliMacS, Linnégatan 56, S11454 Stockholm, Sweden; 46-8-665-4080.

If you're doing page layout in a network environment, DataPage can help you manage project planning, page layout, and product tracking. It monitors activities using linked 4th Dimension databases, and page layout is based on QuarkXPress. The developer, Electronic Publisher International, sells complete turnkey systems. For more information, contact EPI at 215 South St., Excelsior Springs, MO 64024; (800) 333-3305.

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PhotoMac

Full-color scanners are steadily emerging and becoming more affordable, and color-image–editing software is evolving right alongside them. PhotoMac is a dedicated color-retouching application that provides the power of a specialized photo shop and color-separation house.

PhotoMac can import 8-color PICT and 8- and 24-bit TIFF and PICT2 files at any resolution. (Maximum size for an imported image is 32,000 x 32,000 pixels.) The original images can be scanned photographs or graphics created in drawing or painting programs. PhotoMac can even accept a scanned color negative and produce a positive working image. If your Mac is equipped with Data Translation's ColorCapture board, you can input live video and capture a frame of it from within PhotoMac. The frame can be edited and saved like any other file. PhotoMac can also open Truevision (TARGA or VISTA) images from IBM-compatible platforms.

Color-photo retouching must deal with a complex set of variables — not a mere 256 tones, but thousands of colors. It's a data-intensive world where one square inch of a high-resolution image takes up about 260K. With PhotoMac you can work with large images that would easily overrun 2 megabytes of RAM. Instead of keeping an open image in RAM, it uses hard-disk space to hold the excess. This technique lets you have multiple files open, among which you can cut and paste. With this virtual-memory scheme, the speed of your hard drive becomes significant. You'll feel the access lag, and feel it severely, if you use a high-capacity removable floppy drive or an uncached optical drive, both of which are slower than hard disks.

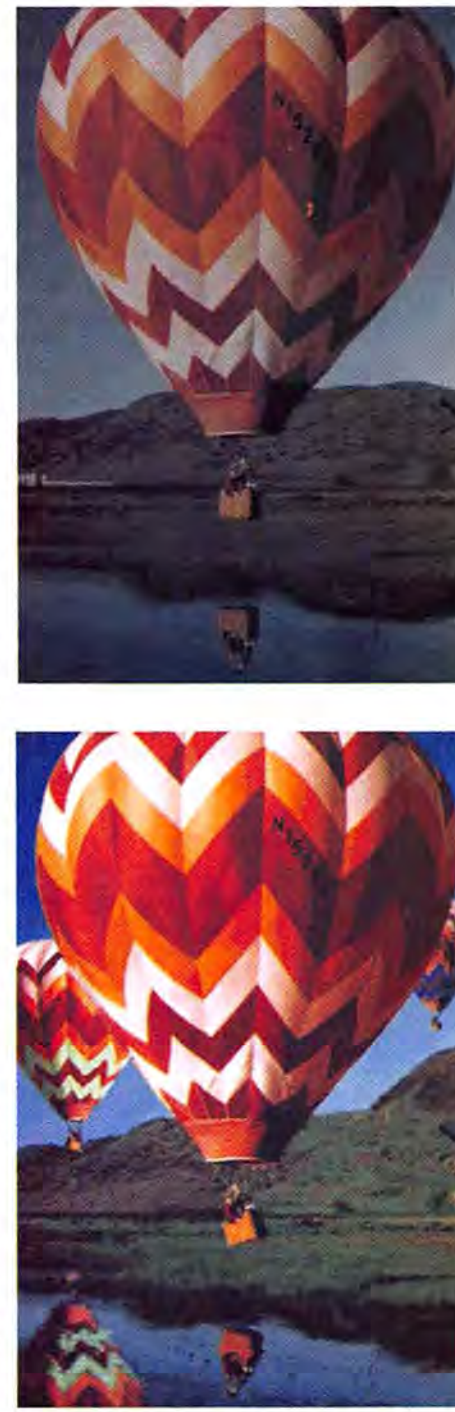
Although it would be ideal to work with a full-color (24-bit) display, this version of PhotoMac doesn't support it — partly because of the fluctuating state of 24- and 32-bit color. PhotoMac lets you use a 256-color (8-bit) display, which can't simultaneously show all the colors of a photographic image. It adapts to that limitation by rendering the visible portion of the image with the best 240 (out of 16.7 million) colors. (The remaining 16 colors of the display are reserved for the palettes, menus, and such.) Every time you scroll or zoom (from 1/8 to 32 times the original size) or change a pixel, and you're idle for ten seconds, PhotoMac optimizes the palette and refreshes the screen. It refreshes when you use a brush and then select another tool, or if you use the color-correction or contrast/brightness controls — even if you cancel. This penchant for refreshing seems a little overzealous, and it costs you time.

One feature I welcomed was PhotoMac's automatic optimization of brightness and contrast. I initially fiddled with the sliders, watching the instantaneous visual feedback until I thought my test image looked its best. Wrong. PhotoMac did far better in just a few seconds.

PhotoMac can alter the color balance of an image for correction or special-effects purposes. It uses the RGB (red, green, blue) or LHS (luminance, hue, saturation) color models for displaying and manipulating color. Notably absent is the CMYK (cyan, magenta, yellow, black) color model, which is the printing-industry standard. A special lasso can identify specific colors anywhere in the image to be affected by the correction. You can preview exactly what areas will be affected by the change. With the combined power of all the selection tools, you can isolate practically anything.

Two paint tools are available: a bristle brush with a good choice of shapes, and an airbrush of variable pattern size, density, and flow. You can paint with any color copied from the image itself or created with a color wheel. The paint can be transparent to any degree from 1 to 100 percent. Partial transparency blends the underlying color with the paint color, and repeatedly stroking an area builds up the paint color.

PhotoMac needs a few extra tools to speed up retouching work: a soft-edged brush to achieve a naturally blended stroke in one step, a color-pusher tool for closing gaps between two regions by dragging one color over another, a brushlike blend tool for creating a seamless transition between two areas, and a color-pickup tool that's key-activated during brush use.



PhotoMac turned this TIFF image (top) into a new piece of art. The contrast and brightness were automatically adjusted. The sky colors were made bluer, while the grass became greener. The original balloon's gondola was tipped, and two retouched copies, plus reflections, were added to the scene. The background structure was removed, and the hill was augmented.



PhotoMac's toolbox

You can compensate for their absence by combining the effects of other tools, but the multistep substitute is more time-consuming and laced with superfluous screen redraws.

The ability to affect or protect specific areas of the image is of major importance, and PhotoMac is well empowered here. In addition to its marquee and lasso tools, it has a tool that automatically seeks out the edges of a colored area. To specify the range of colors to seek out, you drag the tool over an area that contains those colors. You can also select by hand what you don't want and then reverse the selection, so that what you really want becomes selected.

PhotoMac lets you select multiple areas simultaneously with any combination of tools, so you can develop a selection of any shape, even if it's discontiguous. You can deselect areas by pressing Command-Shift and selecting the unwanted portions. Unfortunately, PhotoMac lacks a polygon-selection tool, which would save lots of white-knuckle lassoing while you try to grab the straight or diagonal parts of an irregular area.

Selections can be cut, pasted, flipped, rotated (freely or at 90-degree intervals), and resized (proportionately or not), but there's no numerical way to specify the free-rotation degrees or scaling factor. Option-dragging a selection creates a movable copy. You can blend the boundary of a selection with its surroundings and sharpen or diffuse details inside the selection. You even can opt to turn the selection, or the entire picture, into a 256-shade gray-scale image. If you select an area before painting, erasing, color-correcting, or changing brightness and contrast, the unselected area is protected from any change.

When you're through editing, you can save your image as an 8- or 24-bit PICT2 file or as a 24-bit TIFF file. If your Mac is equipped with the ColorCapture board, you can output the image to any NTSC composite monitor or VCR, or to an RGB monitor (if it has the proper scan rate). You can print a nicely rendered gray-scale version on any PostScript device, or you can produce four-color separations to your exact specifications of dimensions, scale, screen frequency, and angles. PhotoMac creates four color PostScript files (cyan, magenta, yellow, and black) that are downloadable with the included SendPS utility.

Making separations is straightforward, but it seems to require substantial disk space, based on the original scan size, the image's resolution, the screen frequency (lines per inch), and the dimensions of the printed picture. Large images, high frequencies, or enlargements create huge separation files and use more disk space. If you do serious high-resolution color work, you can avoid surprise shortages by using a 100-megabyte or larger disk with at least 50 megabytes free.

PhotoMac is one of the few color-retouching instruments currently available for the Mac. It's a useful and powerful tool that's easy to learn and use. It works on most Mac II systems because it makes relatively minor hardware demands. This is a solid first release, but future releases should include a broader set of retouching tools and make speed improvements wherever possible. Version 1.1, already in the works, will give users more control over the refresh process, and a late '89 release will support the Apple 32-bit color standard and incorporate new tools that work efficiently in that environment.

■ **Salvatore Parascandolo**



PhotoMac ★★★★

List Price: $695
Published by: Avalon Development Group, 1000 Massachusetts Ave., Cambridge, MA 02138; (617) 661-1405.
Version: 1.0
Requires: Mac II with 2 megabytes, System 6.0, color monitor and 8-bit video card, hard disk with at least 2 megabytes free.
Compatibility: MultiFinder friendly.
Application Size: 572K
Copy Protection: None

KeyMaster

Altsys is the creator of Fontographer and FONTastic Plus, so it shouldn't surprise you that its newest program, KeyMaster, has something to do with fonts. Like Fontographer, KeyMaster creates PostScript fonts. The twist here is that KeyMaster isn't concerned with actual letters but with EPSF or PICT graphics that it converts into characters and makes available at a keystroke.

You can turn logos, signatures, boilerplate graphics, and frequently used clip art into KeyMaster fonts. One great DTP use is to take decorative drop caps, which are usually distributed as graphics rather than fonts, and gather them into fonts. Once the fonts are installed, you can place EPSF images into programs such as Word that normally don't support this format. In programs that do accept EPSF and PICT images, you can bring them in as font characters rather than by using awkward or confusing import procedures. To resize a graphic, you simply choose another point size.

KeyMaster is light years beyond crude, bit-mapped graphic fonts such as Cairo and Mobile. In fact, it doesn't even accept bit-mapped images (including TIFF), because they can't be used in a PostScript font. It does accept object-oriented images in PICT or PICT2 formats from programs such as MacDraw and SuperPaint, as well as EPSF graphics created in programs such as FreeHand and Illustrator (EPSF files must include an embedded PICT image).

KeyMaster supports patterns, graduated fills, and text along a path. Although

it doesn't display color on-screen, it can print color EPSF graphics created in FreeHand (and only FreeHand). Color PICT images are converted to gray scale. All of these are converted to PostScript and print with the smooth curves and high resolution that PostScript is famous for.

Unlike Fontographer, KeyMaster is simple to use. In fact, it's one of those rare programs with a manual that makes it look more difficult than it really is. In a nutshell, you select the point sizes, choose the keyboard keys, import the graphics, and save the new font. That's it.

To get started, simply choose New Font, and the Font Attributes dialog pops into view. Here you select the sizes of the bit-mapped screen fonts KeyMaster will generate. The program defaults to 24 and 48 points, but sizes from 1 to 127 points are permissible.

You must also assign a FOND ID number to the font-to-be. The range is between 1024 (the default) and 3071. This isn't the place to delve into font management (or mismanagement) on the Macintosh (see "Fonts by Number" in this issue). Suffice it to say that KeyMaster creates NFNTs — font resources that can be installed only with version 3.8 (or later) of Font/DA Mover and that are not yet recognized by all Mac software. For instance, version 3.0 of PageMaker can't use these fonts, but version 3.01 can. You shouldn't have a problem using KeyMaster fonts with the latest releases of most major programs.

Once you've made these choices, you move to the KeyMaster font window, where you import artwork and match it to keyboard characters. Each KeyMaster font is limited to 16 characters, because of the memory constraints of most laser printers. Although this limit is a consideration mainly for complex graphics, even fonts containing simple images such as dingbats are restricted to 16 characters.

A character can be assigned to a default key *(A through P)* in the font window, or you can choose another one with the Assign Key command. After selecting the key, you merely locate and import the EPSF or PICT graphic. You can also paste PICT images from the Clipboard. Once imported, the image appears in the font window at the appropriate key.

The screen image of an imported graphic is often almost unrecognizable, especially at small point sizes. If you want to clean it up, there's a bit-map–editing window that resembles the FatBits mode in MacPaint (or FONTastic Plus). Of course, editing affects only the screen image; the underlying PostScript image created by KeyMaster will be beautiful on paper, no matter what the screen image looks like.

The edit window also lets you move the image within its character box and adjust the baseline, width, ascent, descent, and origin lines. These changes affect the screen and printed characters.

When you save a completed font, KeyMaster creates three versions: one in a proprietary format that can be reedited later, a bit-mapped version that can be installed with Font/DA Mover 3.8, and a PostScript printer font that you must place in your System folder.

I experienced only one problem with KeyMaster. If you create a character that includes text in a font not resident in your printer, you'll receive an error message when you try to print it. You must download the font first. Also be mindful of memory constraints when importing or printing large, complicated images.

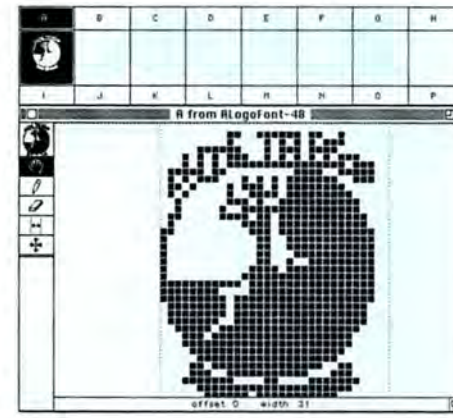
At press time, KeyMaster was undergoing a name change. Henceforth, it will be known as Art Importer. But whatever its name, this is a clever utility. It should be a cost-effective addition to the software library of anyone who uses graphics in everyday business.

■ Gregory Wasson



KeyMaster ★★★★

List Price: $99.95
Published by: Altsys Corp., 720 Avenue F, Suite 109, Plano, TX 75074; (214) 424-4888.
Version: 1.0
Requires: Mac Plus, SE, or II.
Compatibility: Mac II and MultiFinder friendly.
Application Size: 281K
Copy Protection: None



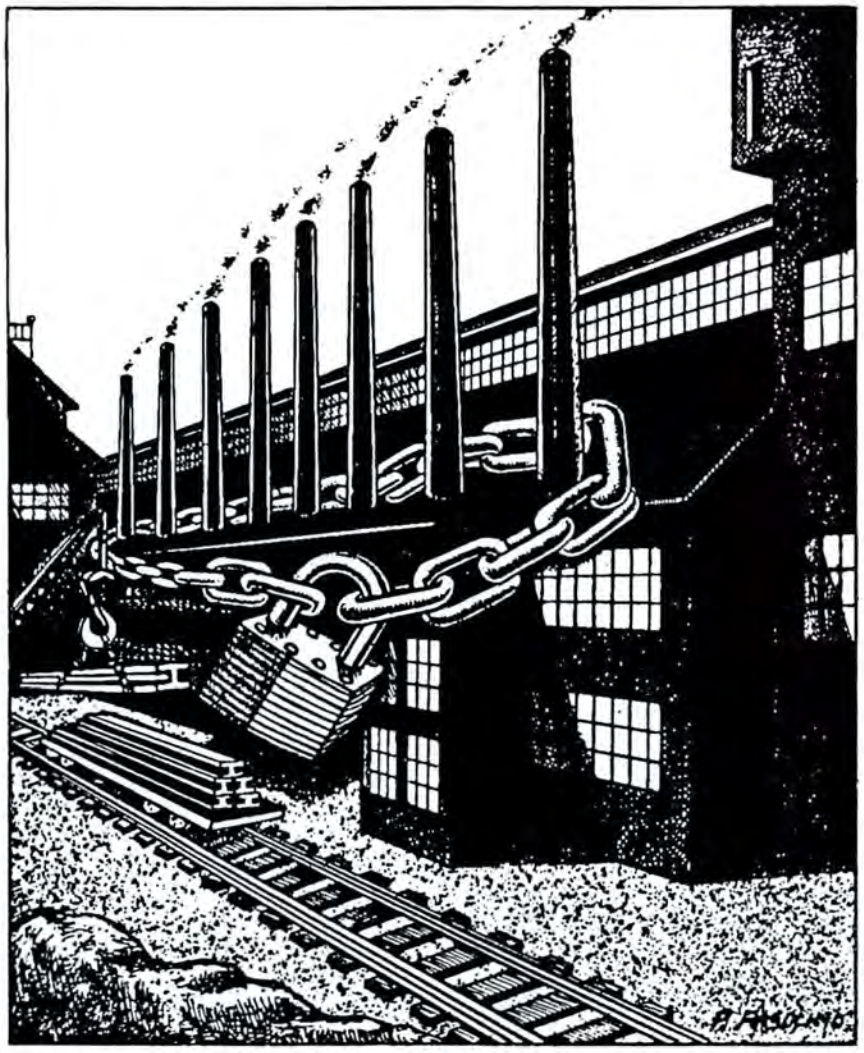
KeyMaster can create a PostScript font containing up to 16 graphic characters. Here, the first graphic has been imported and placed on the *A* key. The screen image looks like a Rorschach inkblot, so it's being touched up in an editing window. One of the smudges is emerging as the first word of a logo.





The PostScript output from a KeyMaster font maintains the nuances of the original images. The logo above, originally created in FreeHand and saved in EPSF, includes a radial fill and text along a path. The cat characters were clip art from Casady & Greene's Vivid Impressions! collection; they're now a bona fide font, thanks to KeyMaster.

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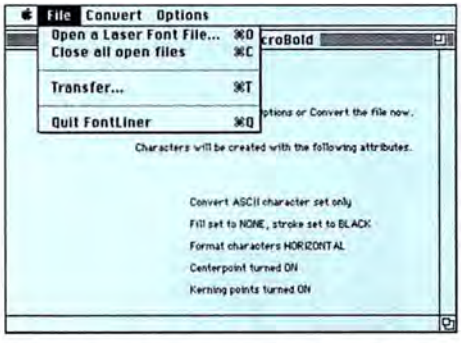
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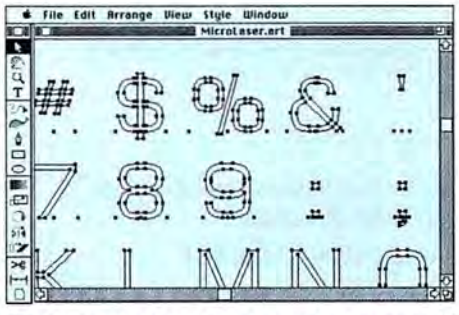
FontLiner

Turning type into art is one of the hottest arenas in DTP. FontLiner, from Taylored Graphics, is the latest entrant in a market shared by LetraStudio, SmartArt, and TypeStyler. But FontLiner offers the potential to create more wide-ranging type effects than any of these programs. It converts typefaces into PostScript outline fonts that can be edited at will in Illustrator or FreeHand.

Hand-tracing a font can take hours, and the results are rarely as good as what FontLiner can produce in mere minutes. What can you do with the results? Well, you can take the type in your logo; convert it to outlines; and then fill the letters with colors, patterns, or even other type. You can clone and scale letters in ways that font-creation tools (such as Fontographer) can't begin to approach. In short, FontLiner does exactly what computer software is meant to do. It makes you more productive while saving you time.



FontLiner has a bare-bones interface, but it is all you need to turn a laser font into a PostScript outline font that can be manipulated in Illustrator or FreeHand.



These "fontlines" have been opened in Illustrator 88 and are ready to be stretched, stroked, filled, or colored. All the handles have been selected, and both center points and kerning points are shown.

FontLiner can read any Fontographer-created laser font. *Any* means exactly that, so FontLiner can even read in and work with logo designs, signatures, and dingbat fonts. The only requirement is that the font was originally created in Fontographer.

This program is very simple. It has only one function and only one menu other than the File menu. Once you've selected the font to convert, you have five options. You can create outline or filled (black) letterforms. The file can consist of just the ASCII characters, or it can include all the characters in the font (such as trademark and copyright symbols). The output can be formatted on horizontal (landscape) or vertical (portrait) pages. Center points and kerning points can be toggled on or off. That's it.

The only thing that FontLiner does is convert a font file to an Illustrator-format document that contains an artwork outline (with control points) for each letterform. The interface is as bare-bones as the feature list. The program was written in ZBasic and has the sparse look of an old-fashioned BASIC program. You don't see an input file on the screen, and you don't see the output file (the results) either. To see and work with your outlines, you have to open your graphics program (a Transfer command on the File menu facilitates that). The sparseness of the interface doesn't really matter, though. FontLiner does what it claims to do quickly and efficiently.

While FontLiner is converting letterforms to outlines, the PostScript code scrolls across the screen. I wish I could capture this code, since it contains the PostScript names for some of the rarer (non-ASCII) characters. The code isn't necessary to work with the resulting file, however, and you end up with the same blank screen you started with.

In the resulting graphic file, each letter or character is 50 points in size and individually grouped. The files can be rather large (120K or more), depending on the intricacy of the original font. Once you copy these "fontlines" into your graphics program, they can be scaled, rotated, reflected, sheared, stroked, or filled. You can add colors or grays. You can even ungroup individual letters and modify their shapes, since they're really pieces of PostScript artwork.

FontLiner doesn't require a LaserWriter or other PostScript printer to work. Of course, you'll need a PostScript printer to print your graphic creations, but anyone who has either Illustrator (1.1 or 88) or FreeHand (any version) can use FontLiner.

FontLiner can't be blamed for its biggest drawback: it can't convert Adobe fonts. Adobe creates its fonts by using a proprietary encryption format that prevents FontLiner from reading the files. That's a shame, because so many interesting Adobe fonts are available.

Fortunately, there are lots of other laser fonts (all created with Fontographer) that FontLiner does work with. The About FontLiner box contains a list — complete with phone numbers — of publishers of compatible laser fonts (from Agfa Compugraphic to T/Maker). Two new PostScript font editors have been announced recently, and based on their specifications, FontLiner should work with both.

FontLiner lists at $129.95, which isn't unreasonable for a professional tool of this caliber. You're already seeing FontLiner effects in some of the best graphic work being done today, and you can use this product to do equally impressive work.

■ **Steven Bobker**

FontLiner ★★★★

List Price: $129.95
Published by: Taylored Graphics, P.O. Box 1900, Freedom, CA 95019; (408) 761-2481.
Version: 1.0
Requires: 1 megabyte RAM.
Compatibility: Works with Mac II, IIx, and SE/30 and with MultiFinder.
Application Size: 57K
Copy Protection: None

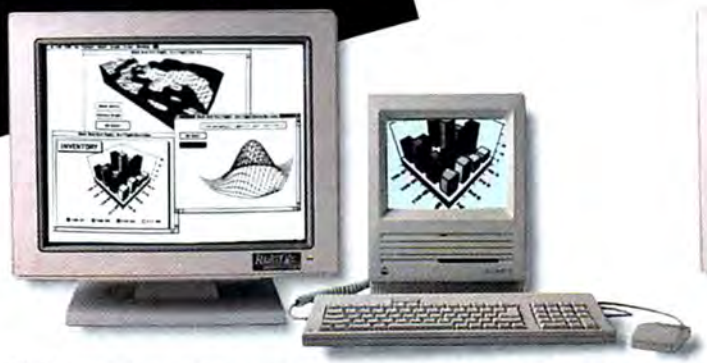
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Fonts by Number

A brief history of how the Mac handles fonts, from the first ten to Font menus that never end.

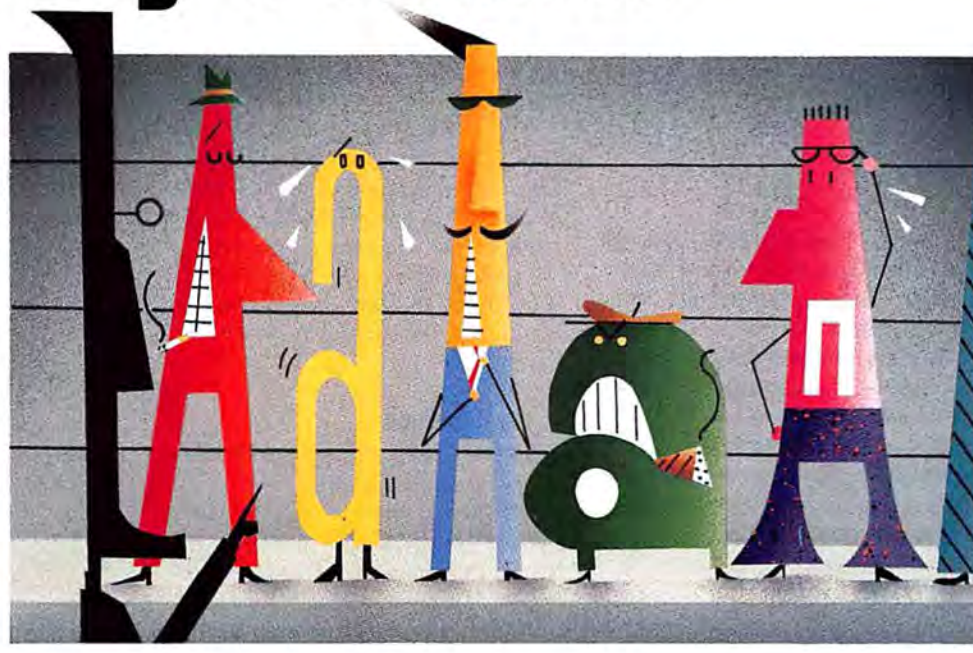


ILLUSTRATION TERRY ALLEN

When the first Macintosh shipped in 1984, it came with ten resident fonts: Geneva, New York, Chicago, Monaco, San Francisco, Athens, Toronto, Cairo, London, and Venice. That was an embarrassment of riches, giving users the power to be typographically versatile or atrocious. The Mac wasn't the first computer to offer a choice of fonts, both on-screen and on paper, but it was the first to offer so much power to so many people.

Apple also supplied Mac purchasers with Font Mover. This small utility program let users remove certain font sizes or even whole fonts from their System file, making it smaller and more useful in those days of single drives and 400K floppies. People soon started thinking about making their own fonts, but thinking was all they could do, because there was no way to create a font.

Then a buggy Font Editor leaked out of Cupertino, and a few hardy souls began to build and modify fonts. Companies such as Miles Computing and Kensington Microware began marketing third-party fonts (their fonts were actually created by Xiphias). Public-domain fonts started to appear on electronic bulletin boards. Apple improved Font Editor and eventually replaced it with ResEdit, which had font-editing capabilities built in.

Identity Crisis

In 1985 Altsys released FONTastic, the first commercial font editor. FONTastic enabled anyone to alter existing bitmapped fonts or to create entire new ones; it's still available as the much-improved FONTastic Plus (see DTP, May '89). New fonts were soon appearing by the dozen; the font floodgates didn't really open, however, until the birth of the LaserWriter and the accompanying onslaught of PostScript fonts.

This tidal wave of fonts created a totally unforeseen problem: font ID conflicts. You select a font from the Font menu, and the screen shows the correct size of a completely different font. Or you drop off a newsletter at the local service bureau and return to discover a mishmash of strange typefaces.

These conflicts occur because the Mac pays attention only to the identification number attached to each font name. It doesn't care at all that New Jersey and California have different names. If they have the same ID number, they have an identity crisis.

How can two fonts have the same ID number? Because Apple didn't foresee the public's thirst for fonts. Its design for the Mac included numbering for only 256 individual font names. In fact, Apple reserved half the ID numbers for itself and told third-party developers that they could use the other 128.

Naturally, the number of fonts quickly exceeded the available IDs. Thousands of Mac fonts are obtainable, all vying for the same 256 ID numbers. The conflicts arise not just among fonts marketed by different manufacturers, but even within a single company. Adobe's rapidly expanding font library has forced it to use the same ID number for more than one font.

Font/DA Mover, which replaced Font Mover in 1985, can resolve some numbering conflicts, but it's no panacea. All it does is automatically change the ID number of a font being installed if it matches one already in place. These

by Steven Bobker



Figure 1: In this ResEdit view of FONTs, FONDs, and NFNTs, a quick scan of the FOND numbers (lower left) reveals a numbering conflict between Times and Trump Mediaeval. It's anyone's guess which would appear if you specified Times. The FOND number for Eurostile is 176; multiply that by 128, add 10 for the point size, and you get 22538, the resource number in the FONT list (bottom right). Note how the FONT resource numbers within a font family relate to each other; NFNT numbers, on the other hand, are essentially arbitrary.

changes are invisible to the user, so you have no way of knowing when a conflict occurs.

The Numbers Game

As mentioned, each font has an identifying number in the range 0 to 255. For example, Geneva is font 3. This ID number is usually assigned arbitrarily by the font maker (Apple assigned numbers for the first fonts), which increases the risk of numbering conflicts.

To complicate matters further, each style variation (bold, italic, and so on) is considered a separate font and so must have a separate ID number. Palatino, B Palatino Bold, and I Palatino Italic must be installed separately, show up separately on Font menus, and require separate ID numbers. (Apple doesn't ship styled screen fonts with the Mac. Without them, the styles that you see on-screen are merely altered versions of the plain font and don't accurately predict the printed results. True bold, italic, and bold-italic screen fonts are available from Adobe and other font makers.)

Each size of each font also has a second number associated with it, because it's stored in the Mac as an ordinary System resource. For the early fonts, this resource type is named, naturally enough, FONT. Each font size has its own separate FONT resource, and each FONT resource has a unique number from 0 to 32767, the maximum value allowed for a resource number.

FONT resource-number generation involves a simple mathematical formula. You multiply the font's ID number by 128 and add the font size to the result. For example, the FONT number for 10-point Geneva is (3 x 128) + 10, or 394. The resource number for 12-point Geneva is 396. Peignot Bold is font 200; the FONT resource number for its 36-point version is (200 x 128) + 36, or 25636.

FOND Families

In 1986, Apple brought out the Mac Plus, with its 128K ROM. This larger ROM allowed Apple to introduce a new type of resource, the FOND (from FONt family Descriptor). The FOND was created to tie together all the sizes and styles of a font family, and it carries the same ID number as the font name (see Figure 1). It's basically a table of information about a font family, including the resource numbers of all related FONTs, both plain and styled, and the associated character-width and kerning-pair data.

Styled fonts had separate FONDs, but they were tied to the main family FOND. Thus, if you specified 12-point Garamond Bold, the Mac would go first to the Garamond FOND to locate the address of the Garamond Bold FOND and then to that FOND to find the resource number for the point size.

Because font families were now linked, you could select Italic from the Style menu and get a true italic font on-screen, instead of a slanted version of the plain font. You no longer had to choose the actual styled font directly from the Font menu (although you still had to have it installed). FONDs solved some problems but not the 256-font restriction. FONT resources were still there, growing by leaps and bounds. Incredibly, some desktop publishers tried to load more than 256 different fonts into their Systems. They didn't succeed.

Avoiding Conflict

Before you convert to NFNTs, be sure your software recognizes them. Otherwise, the fonts may be ignored or converted to Geneva or Chicago.

If you renumber your fonts, you may have problems with older files that were created under the previous numbering system. If you don't want to spend time reselecting fonts, keep a suitcase of fonts with the original numbering scheme.

Check with service bureaus to see how they want you to handle your fonts. As added insurance, always provide a list of your fonts and a draft printout of your job to show what you expect.

In an office situation with shared Macs and files, everyone should use the same set of System fonts (or a common font suitcase).

Font-ID conflicts can occur among fonts installed in applications, the System, and font suitcases. In the event of such a conflict, an application's fonts get priority, followed by those in the System and then suitcases. Avoid cross-conflicts by putting *all* your fonts in one place — or use FONTastic Plus, Suitcase's Font Harmony, or MasterJuggler's Resource Resolver to renumber conflicting fonts.

Be sure you don't have the same font families installed in your System and font suitcases, because only one family FOND can be recognized at a time. If you have Palatino in your System and then open a suitcase file containing any version of that font, the newly opened Palatino FOND will override the System's version, causing it to disappear. Closing the suitcase will restore the System's Palatino. In general, the most recently opened FOND takes precedence.

Enter NFNT

The Mac Plus also contained another new font resource, although it went virtually unnoticed. The NFNT (from New FoNT) is structurally the same as a FONT, except that its number is not tied to a formula based on font number and point size. Thus, an NFNT resource number can range freely from 1025 to 32767. (Actually, 256 to 1024 are also legal numbers, but Apple has reserved them.)

More importantly, the ID number of a font (and its FOND) also has an upper limit of 32767 — a long way from the previous 256-font ceiling. In practical terms, that means the Mac can now use thousands of different fonts without conflicts. Now that's a workable limit!

Another benefit of NFNTs is that the bold, italic, and bold-italic styles can be merged with the "plain" (or roman) font. A single FOND can reference all four styles in a font family, which also means that only one ID number is required, instead of the previous four (see Figure 2). On Font menus, the family name appears only once — as Helvetica, for example. No longer are your eyes assailed by B Helvetica Bold, BI Helvetica Bold Italic, and I Helvetica Italic. This system makes for leaner and meaner Font menus.

The only drawback is that, even with NFNTs, a FOND can accommodate only four style variations. Large font families with styles such as demibold and light must still be split into subfamilies.

Of course, even with 32,767 ID numbers available, conflicts can occur. To minimize the chances of ID overlap, Apple has established a font-ID registry and is issuing blocks of NFNT numbers on request to font makers. Several companies, such as AGFA Compugraphic, are participating in this "clearinghouse" effort.

Since NFNTs are clearly the answer to most, if not all, of the Mac's font woes, you might assume that they're universally used and that FONTs are a thing of the past. Unfortunately, that's not the case. Older Macs with 64K ROMs don't recognize NFNTs and so are stuck with the 256-font limit of FONTs.

In addition, most font makers have been slow to jump on the NFNT bandwagon. Bitstream's MacFontware has used the NFNT scheme since it shipped last year, but the reigning monarch of Mac type, Adobe, announced its support of NFNTs only in March. Adobe plans to reissue its font library with NFNT numbering in the near future. Linotype also recently unveiled the Concert Series, a new version of its type library that "harmonizes" fonts via the NFNT system.

Until recently, many applications couldn't handle NFNTs either. They ignored them or substituted another font such as Geneva. Even that old war-horse Font/DA Mover has lagged in this regard. Version 3.8, released a year ago, is the first to properly handle NFNTs. Be sure you have 3.8 if you're installing NFNTs.

Juggling Suitcases

Font/DA Mover is the font-manipulation tool everyone has — it comes with the Apple System software. It lets you add and delete fonts and DAs from your System file (or any other file, for that matter).

It has always been a problem-ridden application. Some versions didn't like gargantuan font files, the kind that hold fonts with large point sizes, and posted cryptic error messages. Other versions simply froze when asked to move lots of large files. Some versions simply didn't resolve all numbering conflicts, causing later crashes. And, most embarrassing of all, Font/DA Mover couldn't deal with NFNTs for the first two years of their existence.

You should always follow a few simple rules when working with Font/DA Mover.

- Work on a backup copy of your files. You're dealing with System files; never work on originals.
- Always use the newest version of Font/DA Mover (currently 3.8). Never use version 3.6 or lower.
- If you have only 512K or 1 megabyte of RAM, work in small batches. Don't try to move more than 200K at a time.

If Font/DA Mover is the font-manipulation tool everyone has, Suitcase II or MasterJuggler is the font tool everyone should have. Both are INIT files, and picking one or the other is pretty much a matter of preference. If you frequently use PageMaker and a laser printer, get Suitcase II. The current version of MasterJuggler works only with applications that use Apple's LaserWriter drivers (PageMaker uses AldusPrep).

Both programs come with utility software that enhances their performance. Suitcase II comes with Font & Sound Valet and Font Harmony, and MasterJuggler comes with Resource Resolver and Font/DA Utility.

Font & Sound Valet compresses the size of font files from 25 to 60 percent. Since the compressed files are usable only by Suitcase II, you should keep backup copies of the original, uncompressed fonts.

Both Resource Resolver and Font Harmony resolve font-numbering conflicts, even if the fonts are stored in several different files. Font Harmony can merge the style variations of a font family so that only the family name appears in the Font menu. It's also capable of inspecting font files for defects and, in most cases, fixing them. Some early Adobe fonts (those released through May 1988) have structural defects that don't prevent you from using them but that do cause problems if the files are altered. Font Harmony can patch the code.

MasterJuggler's Font/DA Utility is a more versatile application, resembling Altsys' FONTastic Plus. It can rename and renumber fonts, combine the style variations in a font family, and convert FONTs to NFNTs.

Finally, there's N-Font, a free utility from Olduvai. All it does is convert FONTs to NFNTs, but the current version (1.01) does an excellent job with all currently available fonts. You really don't need N-Font, especially if you have MasterJuggler or FONTastic Plus, but it's an excellent application if you have lots of fonts in FONT format and want to convert them to NFNTs quickly.

— Steven Bobker

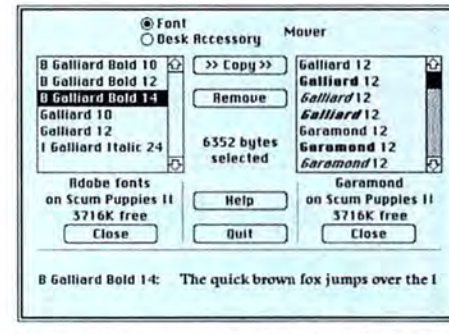


Figure 2: Version 3.8 of Font/DA Mover is the first to support the NFNT numbering system. At left, a few sizes of Adobe's Galliard are shown in traditional FONT format, in which each style has a different name. Bitstream's version of the same font (right) uses the NFNT scheme; Font/DA Mover displays just the family name in the actual styles.



Figure 3: FONTastic Plus is a gem of a font-editing tool. It can show you information about FONDs (in bold) and associated file sizes, including the font-ID number and resource type (FONT or NFNT). You can arbitrarily change the ID number, and a single command lets you convert FONTs to NFNTs (or vice versa). It can also assemble font families for you by merging the FONDs for individual styles into the main family FOND.

Font Management

You don't have to settle for the status quo where your fonts are concerned. Want to see the ID numbers of your fonts? Shareware utilities such as Font Finder, FontDisplay, and DAFont were created expressly for this purpose. FONTastic Plus and Olduvai's N-Font both convert FONTs to NFNTs with a minimum of fuss. FONTastic Plus also lets you change ID numbers and consolidate font families into a single FOND (see Figure 3).

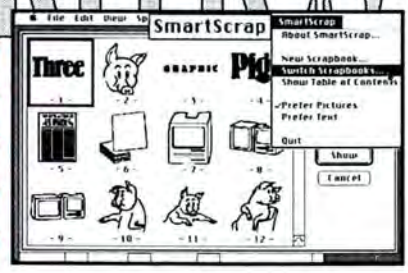
But the cream of the font-handling crop are Suitcase and Font/DA Juggler, both of which appeared in mid-1987. Although these programs (both are System INITs) differ in exactly how they work their magic, both provide the same bottom line. They let you use very large numbers of fonts — far above the 256-font ceiling — very easily. (They also remove the Apple-imposed limit of 15 DAs.) It's the rare hard-disk owner who doesn't use one of these programs.

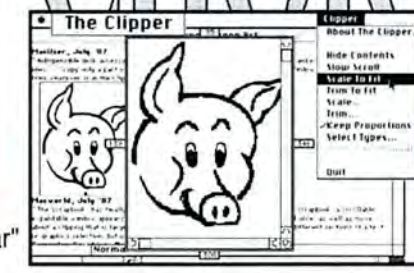
Recent upgrades to both programs allow them to handle NFNTs as well as FONTs. MasterJuggler can display a font list in which each font name appears in the actual font (see Quick Clicks, March '89). Suitcase II takes that idea a bit further, allowing you to have each font name in every Font menu appear in the actual font (see Quick Clicks, June '89).

Both programs come with additional utilities that let you manipulate and optimize your existing font files. MasterJuggler's have both manual renumbering and automatic options, and the Suitcase II utilities work purely in an automatic mode (see sidebar, "Juggling Suitcases").

Names, Not Numbers

Of course, the simplest solution to the font-numbering chaos would be to have

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applications refer to fonts by name, not number. Then it wouldn't matter if Goudy and Palatino shared the same ID number or if your ID number for Galliard differed from your service bureau's.

Apple is encouraging developers to do just that. Several programs — PageMaker 3.01, Ready,Set,Go! 4.5, MacDraw II, and FreeHand, to name a few — now store font information by name. Thus, font-ID conflicts are avoided, no matter what machine you use or what the actual font-ID numbers are. Within a year or so, most programs will be calling fonts by name. When that happens, the typographic freedom the first Macs promised will finally have arrived.

Steven Bobker runs Raw Fish Systems, a Macintosh writing and consulting group. He was formerly editor-in-chief of *MacUser*.

Directory

The best sources for detailed technical information on fonts are Apple's Tech Notes and *Inside Macintosh* — Volume V is particularly good. The MasterJuggler and Suitcase II manuals also are excellent sources of information and are written at a less technical level.

Altsys Corp.
720 Avenue F, Suite 109
Plano, TX 75074
(214) 424-4888
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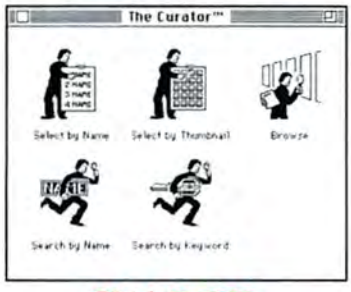
ALSoft, Inc.
P.O. Box 927
Spring, TX 77383
(713) 253-4090
MasterJuggler, $89.95
Font/DA Juggler Plus, $59.95

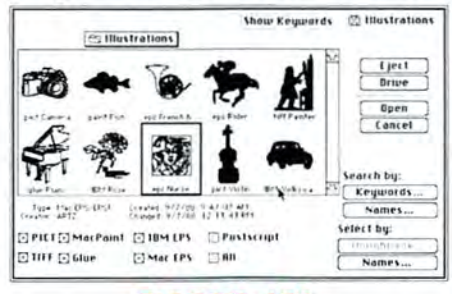
Fifth Generation Systems
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(504) 291-7221
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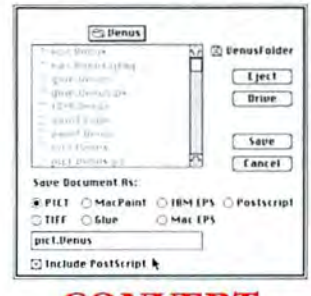
Olduvai
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N-Font, available free with most Olduvai products and from user groups, BBSs, and on-line services (don't ask Olduvai to send it to you).

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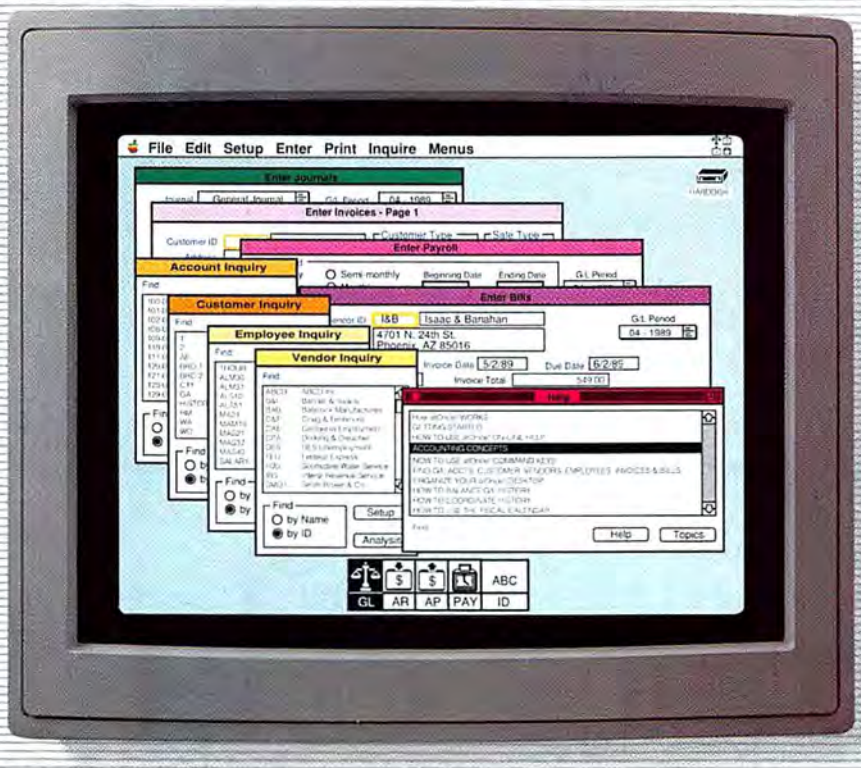
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COMPILED BY GREGORY WASSON

General

If you regularly use many applications and want to keep them all handy, the usual solution is to group all of them in a single folder on your hard disk. Unfortunately, many applications require that you keep several utilities and sample files in the same folder as the application, which makes spotting the application itself difficult. You can remedy this problem by hiding these utilities outside the visible window or by burying them in folders within the application folder, but there is a better way.

Create an empty document in each of the applications you use regularly and keep it in a folder separate from the application. When using one of these blank documents to create a new file, choose Save As to save the new file and to preserve your template. Lock the empty document (using Get Info); this will prevent you from making any changes to it.

These blank pages take up little memory and can be customized to your particular needs and serve as style sheets. I use some preformatted and presigned ones for letters and letterheads.

David McLain
Bellingham, WA

MacPaint

When is MacPaint not MacPaint? It is useful to double-click on a paint file to open it, rather than to load the parent application first. Most clip art comes saved in MacPaint format and will open under MacPaint if double-clicked on. But what if you customarily use FullPaint or SuperPaint instead?

Using a resource editor such as ResEdit or FEdit, or a public-domain utility such as Set File Attributes, you can alter these paint programs so that you can double-click on a MacPaint document and have it load into the paint program of your choice.

Within the resource editor, select the paint program you like to use. Check the field Creator and change what it says to MPNT. If you are using SuperPaint, you also have to do this to the SuperPaint Prefs file. Now quit the resource editor and return to the Finder. You will notice that the icon of your paint program has changed to the MacPaint icon. If the real MacPaint is on disk, get rid of it — otherwise this method won't work. Now double-click on a MacPaint document. It should launch the paint program you patched and load your clip art. [*As with all resource-editing tricks, you should always work on a backup copy of your files. — Ed.*]

Tom Asimos
Texarkana, TX

MacPaint

SPECIAL EFFECTS

SPECIAL EFFECTS

SPECIAL EFFECTS

SPECIAL EFFECTS

Figure 1: Creating special font effects doesn't necessarily require a fancy and expensive program. Even MacPaint has a few tricks — such as these — up its sleeve.

■ Can't afford Laser F/X or one of the other font special-effects programs? Here's an insanely simple way to create special effects in fonts, even on an ImageWriter.

Take any ordinary font in MacPaint. Type your letters on the screen the way you want them to appear. Then select all the text with the Marquee tool. Now you can either trace the edges with a shadow (Command-Shift-E) or trace the edges normally (Command-E). Then you *must* do a Command-Shift-E. Do it several times and fool around with inverting the image and other options to get the best results (see Figure 1 for examples).

Kenneth L. Drake
Tougaloo, MS

■ Have you ever wondered what possible practical use Flip Horizontal could

have in the LaserWriter Page Setup dialog box? (See Figure 2.) If you need to produce large drawings or Gantt charts on the Macintosh for creating blueprints, you'll find this feature helpful.

You can print out large drawings in 8.5-x-11-inch sections on a LaserWriter, using the Flip Horizontal option, which creates a mirror image of the original drawing.

The pages can then be trimmed and assembled with transparent tape on the *back* of the drawing. The resulting 300-dpi flipped-image montage can be used as a master in a blueprint machine.

Jean-Michel Paris
Outremont, Quebec

PageMaker 3.01

Have you ever wished you could open more than one publication in PageMaker? If you have a lot of memory (at least 3 megabytes), a hard disk, and MultiFinder, you can.

Use the Finder to make duplicate copies of PageMaker and rename each copy (e.g., PMK.1, PMK.2). For safety's sake, you should probably place each copy in its own folder with accompanying files. Then launch each copy under MultiFinder. Now you can copy and paste whole pages between publications easily.

Colin Chan
Singapore

■ When dropping an illustration into your publication the old-fashioned way, you must leave a blank space on the page. If you want to have PageMaker automatically wrap text around the illustration, however, you have a problem.

To get around it, simply create an approximation of your graphic, using the ellipse and rectangle tools in the PageMaker Toolbox. Place this ersatz graphic on the page where you want the illustration to go, set the automatic text-wrap specifications as you normally would, and flow your text.

After pouring in the text, make any necessary adjustments, then select the ellipses and rectangles, and choose None in the line menu. The graphic(s) will disappear, but the text-wrap specifications will remain in place.

Gordon T. Maupin
Dalton, OH

Apple File Exchange

Here's a tip aimed at people who do a lot of MS-DOS–to–Macintosh conversion, using the Apple File Exchange.

IBM PS/2s and compatibles that use a 3.5-inch 1.44-megabyte drive can read, write, and format a high-density (2-megabyte) disk at the lower 720K density. Unfortunately, when trying to read these disks on a SuperDrive-equipped Macintosh, Apple File Exchange assumes that it formatted at the 1,440K density. AFE is looking at the extra notch on the disk before it attempts to read the actual format.

You can fool the SuperDrive hardware into thinking it has a standard DS/DD (double-sided/double-density) disk by using a piece of tape to cover the extra notch (or to further confuse the issue, you can use a write-protect sticker, as used on those archaic 5.25-inch floppies).

Also, AFE displays hidden files, such as the desktop, and seemingly transfers them to an MS-DOS disk. However, the only thing that gets transferred is an empty file that is hidden on the MS-DOS side (i.e., the file's contents are not transferred, but a hidden file is created). If you make a habit of hiding your data files under a security program, you'd best unhide them before trying to transfer them to an MS-DOS disk.

Corwin Low
Seattle

Microsoft Word 3.0

Following up on the tip in the August '88 *MacUser* concerning the application of a background screen to a paragraph in Word, here's a PostScript sequence that places a border around an entire page:

```
. page .
  /wp$new { newpath 36
36 moveto wp$x 72 sub 0
rlineto 0 wp$y 72 sub
rlineto wp$x 72 sub neg 0
rlineto closepath } def
4.0 setlinewidth wp$new
stroke
```

This sequence places a box with a 4-point-wide border indented 36 points from every edge. The number 72 is simply 2 x 36. Change 36 to 72 and 72 to 144 to achieve a 1-inch border and modify the

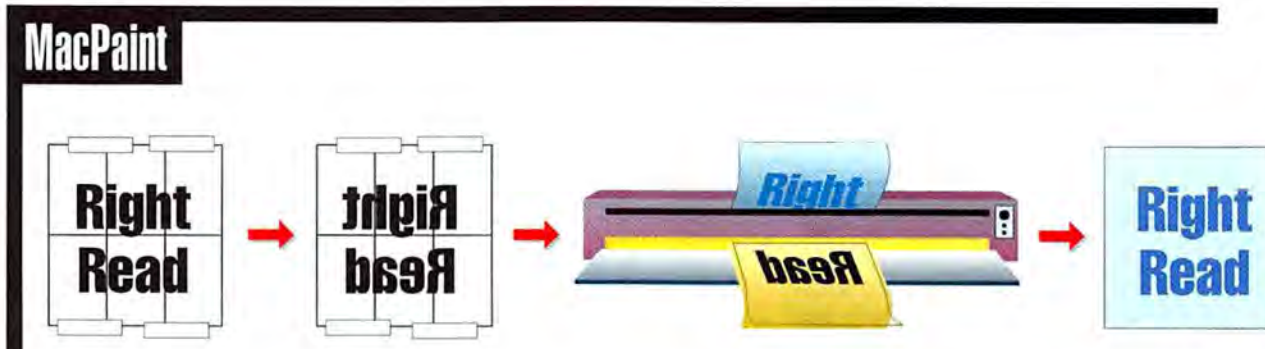


Figure 2: Use MacPaint's Flip Horizontal option to get a reversed image onto a blueprint. Print the flipped image, tape it to the back of the working drawing, and place the two-sided drawing into a blueprint machine. The foreground and background will be correctly superimposed.

number before the word `setlinewidth` to suit your needs.

John Wiesenfeld
Ithaca, NY

■ If you want to mark a draft Microsoft Word document to print out on a LaserWriter as such, do the following:

Insert, in PostScript style, the text below in a header before the normal header information. You can also insert this code just before the first paragraph on each page of a document, but putting this into the header saves you a lot of pasting and formatting. And in case you need reminding: to format this text in the PostScript style, select it, go to the Define Styles menu, and type `PostScript`.

```
.page.
/TM {wp$y wp$top sub} def

/LM {wp$left} def
/RM {wp$x wp$right sub} def
/printline TM 100 sub def
/putcenter
 {dup
 RM LM sub
exch stringwidth pop sub
2 div LM add
3 -1 roll
moveto} def
/AddToPath
{ putcenter
true charpath
} def
newpath
/Times-Bold findfont 140
scalefont setfont
printline (D)
AddToPath
printline 140 sub (R)
AddToPath
printline 280 sub (A)
AddToPath
printline 420 sub (F)
AddToPath
printline 560 sub (T)
AddToPath
gsave
0.9 setgray fill
grestore
```

When you print your document, this code will place the letters "DRAFT" centered down the page in a light gray.

John A. Lambert
Merewether, New South Wales
Australia

QuarkXPress 2.0

Here are two tips that are helpful for anyone who uses QuarkXPress 2.0 and the Apple Scanner.

There is a problem with the way QuarkXPress handles line art saved as PICT files in AppleScan. An AppleScan PICT file placed into QuarkXPress will look OK on the screen but will print out garbage on the LaserWriter. If you import the same file in the TIFF format, QuarkXPress automatically assigns a halftone screen value to the line art, which ruins its clarity.

A solution that is not documented in the QuarkXPress manual is to save the line art in the TIFF format in AppleScan, and then to hold down the Command key when selecting the file in QuarkXPress, using the Get Picture command. Doing so imports the file as nonhalftoned line art. Now you can take advantage of nearly all the options on the Style menu, such as Negative, Contrast, and Brightness, which are not available for any graphics imported as PICT files.

When irregularly shaped pictures are scanned with AppleScan and then imported into QuarkXPress, it is usually impossible to use the automatic text-wrap features. When text is wrapped around the imported graphic, it wraps only around the shape of the graphic box.

Here's a solution that allows you to wrap text around an irregularly shaped image imported from AppleScan. While in AppleScan, select the irregularly shaped object, using the Lasso tool. After the object is selected, AppleScan gives you the option Save Selection As in the File menu. Save it as a TIFF file so that it can be imported into QuarkXPress (as described above). Now, after you've imported the TIFF file, you can go through the steps to create a wraparound. The text will wrap perfectly around the shape of your object, and if you put the object into a rectangle picture box, you can set the Text Outset to anything you want.

William Kelly
Rolla, MO

Tip of the Month

■ If you've found yourself disappointed by the results of the auto-trace features of programs such as Illustrator, FreeHand, or Canvas 2.0 after the initial excitement, you're in for a pleasant surprise — at least in the case of Canvas.

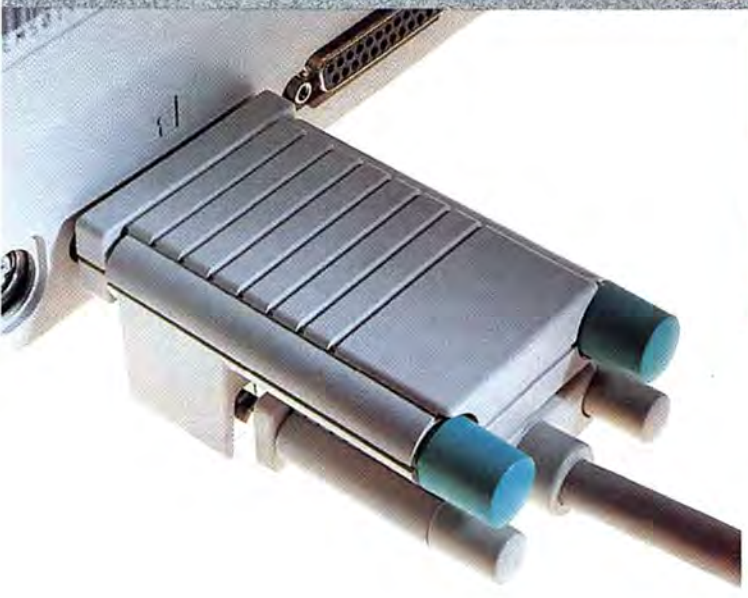
To make your traces more realistic and closer to the original, first select the bit-mapped object and choose the Object command from Canvas' Object menu. Change the resolution in the dialog box from 72 to 300 dpi. Click on OK and close the box. Now auto-trace the object. Figure 3 shows the dramatic improvement this step can make. The increased resolution creates more handles, which also makes additional editing easier.

Andrew C. Alt
Park Ridge, IL



Figure 3: Canvas 2.0 has an AutoTrace tool with a difference — an undocumented feature. By increasing the resolution of the underlying bit map, using the Object command, you can create better traces. The top object is the original bit map, the middle object is the trace made on a 72-dpi bit map, and the bottom object is a trace made after the same bit map was modified to 300 dpi with the Object command.

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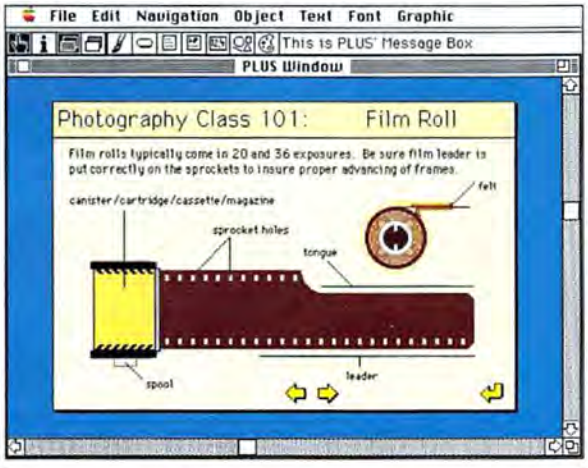
This month, take a peek at Plus, the latest HyperCard-like system that's waiting in the wings, and get the scoop from the fourth Microsoft CD-ROM conference. Enter a fantasy world when we lift the lid on The Manhole CD-ROM disk, and get a little Culture. Michael Swaine investigates the stackware doldrums in Card Tricks, and something's hiding in HyperCard's hidden fields.

A New Card in Town

From West Germany comes the latest "challenge," or "enhancement" (however you want to look at it), to HyperCard. Plus, from Format Software, is like HyperCard in many ways. Based on the card metaphor, it uses buttons and links and has navigation tools much like HyperCard's, and its Plus-talk language is much like HyperTalk, but with extensions for using new features. It also promises to be fully compatible with HyperCard.

On the Plus side are features HyperCard users have been wishing for since HyperCard was first released. Most important are Plus' color support; large, resizable, scrolling cards; color object graphics; word-level links; and database features. Add to that word-processing capabilities, sound storage, a communications package, and the ability to access other applications from within Plus.

Several of Plus' features are worth a closer look. It has MacDraw-like objects as well as floating paint objects. Both types of graphics can have scripts attached to them, and you can create irregularly shaped buttons for your paint objects. You can use single words in a text field as hypertext buttons by holding the Option key down and double-clicking on them. A script attached to the text field handles what happens, depending on which word is clicked.



Plus' color and scrolling cards are distinct advantages of this HyperCard-like application. Notice the unique tool bar. Clicking on an icon brings up all the related tools.

Plus' scripting interface presents you with a wide window with both vertical and horizontal scrolling and pull-down menus that list all Plus Programming Language (PPL) commands.

A database-field dialog box gives you control over data input. For example, you can specify that entries be of a certain length or be only text, numbers, or dates. You set the format much as you would in a spreadsheet. Block justification and rulers are planned features for word processing, and improvements over HyperCard's print capabilities are promised. And Plus' programmable communications package lets you access services such as CompuServe, MCI, or Dow Jones News/Retrieval.

A look at Plus' main screen shows many differences between it and HyperCard. Plus has full-screen windows with scroll bars and close boxes and an expandable tool bar (no tear-off menus here). Its standard tools are Browse, Information, Foreground, Background, Paint, Button, Text Field, Word Processing Field, Database Field, Object Graphic, and Message Box. When you select a particular icon, the tool bar changes. For instance, clicking on the button icon brings up a button tool bar with a choice of seven types of buttons. There's a DrawObject tool bar as well as a PaintObject tool bar.

Plus runs in color, and color stacks can be run in black and white. Format recommends a Mac II with color, 2 megabytes of RAM for color, and a hard disk for the optimum use of Plus. Plus is still in prerelease form as of press time, although it should be available in Europe by the time you read this. The price is expected to be between $195 and $295. Format is located at Widdersdorfer Strasse 236–240, D-5000 Köln 30, West Germany.

— Laura Johnson

CD-ROM on Parade

The theme of Microsoft's Fourth International Conference on CD-ROM held in March was "Seeing Is Believing." Appropriately enough, it took place right across the street from Disneyland, where that theme has been elevated to an art form. And, for the first time, it seemed that CD-ROM technology had indeed moved out of Frontierland and onto Main Street USA.

The new titles include Broderbund's The Electronic Whole Earth Catalog,

EDITED BY LAURA JOHNSON

Xiphias' The National Directory, Software Mart's CD-ROM Developer's Lab and Media-Mixer, and Apple's HyperCard CD Audio and HyperSource ToolKits, as well as a rumored (but nebulous) title from Microsoft. (Microsoft was running a nifty Mac-based music-encyclopedia disc in its booth, which it insisted was a technology demonstration only, rather than a product slated for commercialization.) The Voyager Company was also demonstrating music stackware that combined laserdisc-based stacks that provided a running, synchronous commentary on conventional audio CDs played in the CD-ROM drive.

For in-house disc developers, Optical Media International and Meridian Data announced disc-production stations for prototyping and low-volume production runs. These systems, ranging from $100,000 to $150,000, are too slow for high-speed duplication but reduce the entry-level cost of disc production by more than an order of magnitude and may herald the coming of desktop disc production through service bureaus. Several companies also showed off disc-mastering software — such as version 2.0 of Quantum Access' Quantum Leap — that generates Mac- and MS-DOS–compatible database front ends in one fell swoop.

On the hardware side, three or four different laptop-style CD-ROM players were on display. They were only slightly larger than the player Jim Phelps uses in the new "Mission: Impossible," although they hopefully won't self-destruct in five seconds. Fujitsu also displayed its new FM-TOWNS MS-DOS–compatible PC, which features NeXT-like styling, a Mac-like interface, and a HyperCard-like application developer, as well as a built-in CD-ROM drive.

For Apple, the best news was that megadistributor Micro D has agreed to sell Mac-compatible discs through its dealer channels, a move that will make the products and technology far more visible than they've ever been before. There was also bad news for Apple, though. Pioneer announced plans to price its forthcoming six-disc player at or below the $1,200 price that Apple charges for its single-disc player. This pricing strategy may have a silver lining for Apple: if the Pioneer drive triggers a price war, it could break the chicken-and-egg deadlock between, on the one hand, software developers who are reluctant to develop titles until there's an installed base of hardware and, on the other hand, hardware manufacturers who must maintain high margins until drive sales take off — which won't happen until more titles are available. Even Apple will be thankful if aggressive drive pricing helps break this vicious circle, transforming CD-ROM from a Mickey Mouse technology in search of a market to a gateway into magic kingdoms of information.

— Jon Zilber

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And VMacS, which allows users to store and manage Macintosh files on the VAX's hard disks and tape drives.

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Lift the Lid on Manhole

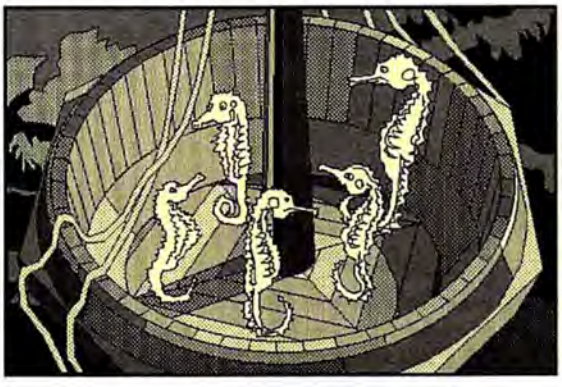
Put some kids in front of a manhole cover, and they're going to wonder what's down there. Normally, you wouldn't encourage them to see for themselves, but that's just what Activision's done with Manhole, an interactive adventure for children. Judging from the crowds surrounding the company's booth at the January Macworld Expo in San Francisco, where Activision unveiled the CD-ROM version of Manhole, it attracted the kid in a lot of us.

You can explore the depths with dancing sea horses and climb a beanstalk to castles in the sky with this delightfully illustrated fantasy. Children of any age are the main characters, choosing their own way through this whimsical world, which also is home to a tea-drinking rabbit, sleepy walrus, and French-speaking turtle.

Activision calls Manhole the computer industry's first CD-ROM entertainment product. It contains more than 55 megabytes (69 floppies' worth) of information, including finely drawn graphics, digitized voices for its animated characters, and a musical sound track that enhances children's visual experiences.

Manhole was first released as a five-disk set of HyperCard stacks in November '88, with more than 4 megabytes of graphics and sound but without the musical score of the CD-ROM version. (Incidentally, you can play the sound track on a conventional audio CD player as well.) A disk version is available for $49.95, and the CD-ROM is $59.95. Contact Activision at 388 Bohannon Drive, Menlo Park, CA 94025; (415) 329-0800.

— Laura Johnson



Dancing sea horses are among the many jewels in Manhole's treasure chest of adventures.

Get a Lotta Culture

More than 2,800 years of history (and 5+ megabytes) reside in your Mac when you install Culture, The HyperMedia Guide to Western Civilization, on your hard disk. This product, from Cultural Resources, comes on seven diskettes and contains more than 1,700 cards; 200 images of people, places, and works of art; 75 melodies by famous composers; and almost 90 general and historical essays (covering people, events, and other important aspects). It is based on many years of research by Walter Reinhold — teacher, lecturer, and specialist in music history and the humanities — of New York University.

It divides culture into six historical periods, from the Middle Ages up to the 20th century. Other periods are covered in two supplements: Biblical History and Literature, and Greco-Roman Culture. A third supplement, Cultural Almanac, shows famous births, deaths, and other important events for each day of the year.



The 5-megabyte Culture stack includes a Cultural Grid that makes it easy to compare different aspects of the development of history and art in different periods and countries. For example, you can see how the literature of Great Britain compares with that of France by clicking on the appropriate buttons.



In addition to offering easy access to any of the historical time periods and the supplemental resources and essays, Culture uses timelines and links to highlight relationships among different periods.

From a period card, you can access an introduction to the period and essays on the art and music of the time. Each period is divided into subperiods, and a click on any one leads to a subperiod cultural grid with buttons linked to cultural aspects (such as history, art, and literature) of different countries. You can also make notes and create paths linking information you feel is important.

Students of culture can view text and graphics (of course, it's not quite like seeing the Mona Lisa in the Louvre) and hear melodies from musical works of each period (not quite like hearing Beethoven's Ninth at the Philharmonic, either). Above all, Culture's multimedia approach imparts a sense of the interrelatedness of events and the arts.

Culture 1.0 sells for $175. An upgrade covering the 20th century (at $25) is planned for midyear. Culture must be installed on a hard disk and requires HyperCard 1.2 or later and a minimum of 1 megabyte of RAM. Contact Cultural Resources, Inc., at 7 Little Falls Way, Scotch Plains, NJ 07076; (201) 232-4333.

— Laura Johnson

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CD-ROMs

The BMUG PD ROM
Educorp CD ROM
ClubMac

Sure, I'll review three CD-ROMs full of software, I tell my editor. When I get the discs home and look at what I have to do, I suffer a head crash. Not the disc drive head — *my* head, coming into contact with my keyboard.

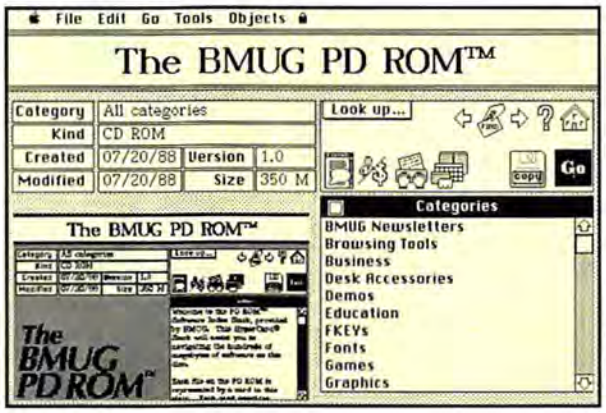
The three CD-ROMs contain nearly a gigabyte of software in about 20,000 files. Rather than run every program, I decide that my only hope is to evaluate the three discs on the basis of weight and packaging — in terms of the amount and kind of software collected and of the usefulness of the collection's organization, that is. I soon discover that organization is very important, since running the Find File desk accessory on a CD-ROM is about as much fun as indexing the Library of Congress on 3 x 5 cards.

The three CD-ROM discs are The BMUG (Berkeley Macintosh Users Group) PD ROM (published by Discovery Systems), Educorp's CD ROM, and Quantum Access' ClubMac.

BMUG says the PD in PD ROM stands for publicly distributable. Its disc is a collection of nearly 300 megabytes of shareware, public-domain software, and demoware, including more than 20 megabytes of electronic messages downloaded from Macintosh forums on several electronic networks. It's organized by category: business, education, games, fonts, Mac II–specific products, and so forth.

The philosophy behind Educorp's disc is similar to BMUG's. The Educorp CD ROM also contains about 300 megabytes, but without the messages, meaning there's about ten percent more shareware, public-domain software, and demoware, similarly organized by category. Version 2.0 of Educorp's disc, containing approximately 550 megabytes of information, should be available by the time you read this.

The ClubMac disc is the most ambitious in organization and concept. "ClubMac is a cross between a magazine, a bulletin board, and a software distribution center," according to Quantum. The first volume, Fall 1988, has more than 400 megabytes of public-domain software, shareware, demoware, and electronic messages, plus features supporting the magazine/bulletin-board concept. The second, Winter 1989, contains more than 550 megabytes.



BMUG's PD ROM disc contains more than 300 megabytes of shareware in 38 categories.

There is a significant overlap among the programs on these three discs — as high as 90 percent in some categories, by my estimation — but the raw size of the overlap doesn't tell the whole story. For example, each disc has the resource editor ResEdit, but each has a different version of the often-revised utility (BMUG's disc has the most recent). (As I sketch what's on the discs, I'm hitting only the highlights; each disc has cdevs and INITs, for example.) Beyond the overlap, there are some clear-cut differences in content. There are also significant differences in the discs' organization and in the screening of the software.

BMUG's PD ROM has 500 fonts organized into display, PostScript, laser, picture, and foreign-language fonts, plus font utilities. There are several dozen Excel templates, the 726K demo version of 4th Dimension along with many examples, about 70K of HyperCard stacks, more programming tools than the other discs, and surprisingly little music (but good sound utilities). Everything on the disc runs under System Release 5.0 on a Mac SE or Plus, except for the files explicitly designated for the Mac II family.

Its electronic messages are judiciously selected and include the Arts & Farces newsletter and digests from Delphi, EchoMac, and USEnet. Not surprisingly, this is the only disc with a complete set of BMUG newsletters. Good stuff.

The hierarchical organization of the BMUG disc generally runs three or four levels deep. So, for example, you'll find the program Parametric Statistics 2.0 in the Statistics/Data Analysis folder within the Mathematics folder within the Education folder. There are 20 top-level folders. Generally, I find the organization intuitive, but I occasionally need help to find files. (Are text utilities filed under text or utilities?) Fortunately, the disk has several helpful indexing tools.

BMUG provides a range of support services to members, including a technical help line, an electronic bulletin board, and a subscription to its newsletter. (Buying the PD ROM doesn't confer membership in BMUG, though.) Only the BMUG disc contains written documentation, an eight-page insert comparable to those in music CDs.

The Educorp disc has a complete electronic bulletin-board system and more music than the BMUG disc. It has more than 100K of stacks but does not include HyperCard or the 4th Dimension demo. Comprising only software, with no downloaded messages, it has roughly ten percent more programs than the BMUG disc.

At the top level, the Educorp disc is organized into 23 categories, such as business, education, fonts, and Mac II–specific files. The breakdown at the second level is mostly by volume number (which appears to mean Educorp's acquisition date), and the next level (if any) is again by category. The volume numbers are useless here.

One nice feature is a liberal use of self-running documentation files that tell how

to use or install certain categories of files, such as laser fonts, but it lacks good navigation or indexing tools for finding things on the disc.

Printed on the face of the Educorp disc is a cagey disclaimer regarding the screening and selection of software on the disc. The disc is "a chronicle of Macintosh public domain & shareware software development." In other words, some of this stuff is of historical value only and won't run on current systems. Educorp presents a frank explanation of this potential problem and suggests some things to do about it.

The first ClubMac disc has a lot of font utilities and about 500 fonts. There are 450 desk accessories, 95 sounds, 250 snippets of music, 20 editors, scores of word-processing utilities, 12 cdevs, 12 startup screens, 8 rdevs, 55 Fkeys, and 64 INITs. There are spreadsheet templates and 80 megabytes of stacks. Quantum has included the full HyperCard version 1.2 and full Apple System versions 5.0 and 6.0. The second disc has this much and more.



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The BMUG PD ROM ¥¥¥¥

List Price: $99.95
Published by: Discovery Systems, 7001 Discovery Blvd., Dublin, OH 43017; (614) 761-2000.
Version: 1.0
Requires: CD-ROM drive; Plus, SE, II; HyperCard 1.2 supplied.
Application Size: 300 megabytes.
Copy Protection: None

Educorp CD ROM ¥¥¥¥

List Price: $199
Published by: Educorp Computer Services, 531 Stevens Ave., Suite B, Solana Beach, CA 92075; (619) 259-0255.
Version: 1.1
Requires: CD-ROM drive; Plus, SE, II; HyperCard 1.2.
Application Size: 300 megabytes.
Copy Protection: None

ClubMac ¥¥¥1/2

List Price: single issue, $199; four quarterly issues, $350.
Published by: Quantum Access, Inc., 1700 W. Loop S., Suite 1460, Houston, TX; (713) 622-3211.
Versions: Fall 1988, Winter 1989.
Requires: CD-ROM drive; Plus, SE, II; HyperCard 1.2 supplied.
Application Size: Fall 1988, 430 megabytes; Winter 1989, 550 megabytes.
Copy Protection: None

I find it pretentious to call downloaded messages "articles" and "reviews." They include company press releases (including Quantum's); an obsolete (pre-HyperCard) list of "current" version numbers of software compiled by Steve Bobker for this magazine; and my own favorite, "a note from Frank to Chris, which is basically about fonts."

The ClubMac editors intend for the disc to be distributed quarterly and have put many services on the disc in addition to the software. It includes a user-rating system for products, a section for classified ads, and many of the forum features of an electronic bulletin board — and Quantum does not charge users for participation. Users can dial up Quantum's real electronic bulletin board to upload their contributions or request technical support. The BBS is intended to be an online extension of the disc — an interesting idea, but there are problems in the execution.

The first ClubMac disc was handicapped by illiteracy, which affected the usefulness of the disc: it's remarkably hard to search for anything by keyword when *breadboard* is spelled as two words, *aperture* is spelled "appeture," *floppies* is spelled "flopies," and *circuit* is spelled "cirquit." Quantum has not cleaned up the spelling for the second disc, but the organization is significantly improved, so it's not as critical to be able to search by keyword.

The organization of a CD-ROM compendium affects both the ease of finding a file on the disc and the access speed. In informal testing, I found it easiest to locate a file on the BMUG disc. When it comes to accessing a file, the BMUG disc is generally fastest, and the ClubMac discs are the slowest. When you're examining a gigabyte of software, you care about access speed.

— Michael Swaine

STELLAStack

In the "Why STELLAStack" section of the STELLAStack manual, the authors state that this new stack and its accompanying software will bring about a "virtual revolution in learning." I'm not sure that any product as specialized as STELLA (reviewed in June '88) can spur a revolution in learning, but it can enhance learning by letting users explore simulations and artificial realities. The innovative software that these authors are referring to is a HyperCard stack that allows novice STELLA users to penetrate the power of the STELLA simulation package. This product is not a new way to bring STELLA's pipes and flow controls to the public; it's a way to mask these abstractions behind the familiar icons and MacPaint graphics of HyperCard.

One of the biggest problems with the STELLA simulation software is its user interface. Everything is numbers and graphs. It takes a lot of time to set up a simulation so that it runs correctly, and once a simulation is running, it isn't always easy to understand. You have to be familiar with such things as system dynamics, stocks, flows, and feedback.

STELLAStack lets you take a model created in STELLA and change its boxes and circles into familiar images. It provides a window into a STELLA simulation — a way to turn the tedium of academic variable manipulation into attractive stacks that can give real-world people a taste of simulation. With a good model hiding below a well-constructed stack, much can be learned from simulations.

At the heart of STELLAStack is the STELLA kernel, a C extension to HyperCard that lets HyperCard designers embed the guts of STELLA in their stacks. A STELLAStack application begins as a Boilerplate Stack. The manual's step-by-step, but boring, approach to building stacks, along with several excellent on-disk examples, helps STELLA modelers turn their stock and flow representations into images filled with lions and tigers and grizzly bears.

The nice thing about embedding any application in HyperCard is the ability to put HyperCard bells and whistles into otherwise-mundane occurrences. STELLA's stark world of lines and circles instantly livens up with clever graphics, digitized sounds, and a host of other HyperCard amenities, limited only by your ingenuity.

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step into the interface and change the models in real time. In STELLA models, you set variables, write equations, and then let the model run to see the results. With STELLAStack, you can step inside the model and adjust variables, pause and change parameters, and then send the model back with a changed outlook. If you have already learned STELLA, mastering STELLAStack will be simple. The STELLAStack manual, although sometimes a little wordy, is well organized and helpful.

Learning STELLA and STELLAStack at the same time is worth the effort if good simulations with snazzy interfaces are your goal. The correct placement of graphics and creative linking of stacks and simulations are elements only you can ponder and implement. Several sample STELLA models and stacks, including examples from such diverse areas as discrete modeling and sensitivity analysis, can help you learn. I had the most fun playing with the Corporate Flight Simulator stack, which not only is entertaining but also illustrates some excellent hints for stack authors. Each of the stacks is well executed and can be useful for building applications.

Nothing in STELLAStack is copy-protected, but distribution of the STELLA kernel or run-time version of STELLA is prohibited without written permission from High Performance Systems. That's unfortunate, since some developers will be less interested in building stacks if they need written permission to distribute them throughout their organization.

STELLA and STELLAStack are difficult to compare with other programs such as Imagine That's Extend. The basic concepts behind these simulation packages are diverse, but they have the same goal: to let users play out what-if scenarios to explore real-world simulations that lend credence to their speculations. STELLA is much easier to operate than Extend but much less accessible to the untrained. Although using Extend requires some programming, the programs are fairly simple to write and require minimal remodeling of the world. With STELLA you need to change your perspective and then fit your simulation into the new perspective. Extend and STELLA had



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Dr. James Sheedy, University of California
The New York Times

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Evidence mounts which shows a connection between non-ionizing radiation and skin irritation, eye damage, and an increase in miscarriages.

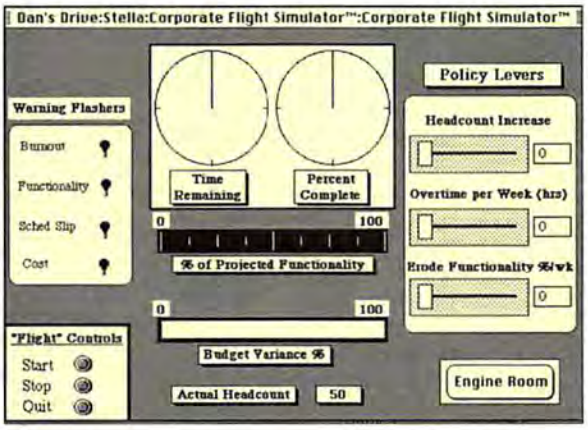
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Through its interactive graphic interface, STELLAStack allows users to jump inside a model and change it during a simulation, as in this Flight Simulator. Several STELLAStack interface tools, such as sliding buttons, radio buttons, and circular and bar graphs, are visible in this model.

only animated graphs prior to STELLAStack. With STELLAStack, STELLA now performs some minor animation feats, none of which, however, are comparable to high-end simulation graphics running on other systems.

As with STELLA, the programming of STELLAStack takes some getting used to. Its inclusion in the easy-to-use HyperCard does not insulate it from the abstraction and new thinking its methodology requires, but STELLAStack brings the charisma of this simulation technique to a wider audience without the intellectual overtones and intense deliberations. Any stack can become a systems model without requiring its users to be systems engineers.

STELLAStack turns a complex modeling system into a point-and-click exploration. Although STELLA may have proven useful in the past to analysts and philosophers, only with STELLAStack will front-line business employees find use for such a sophisticated simulation tool.

— Daniel W. Rasmus

STELLAStack ★★★★

List Price: $295
Published by: High Performance Systems, Inc., 13 Dartmouth College Highway, Lyme, NH 03768; (603) 795-4857.
Version: 1.0
Requires: Mac Plus or later, HyperCard 1.2.1, STELLA.
Compatibility: Mac II and MultiFinder friendly.
Application Size: 50K
Copy Protection: None

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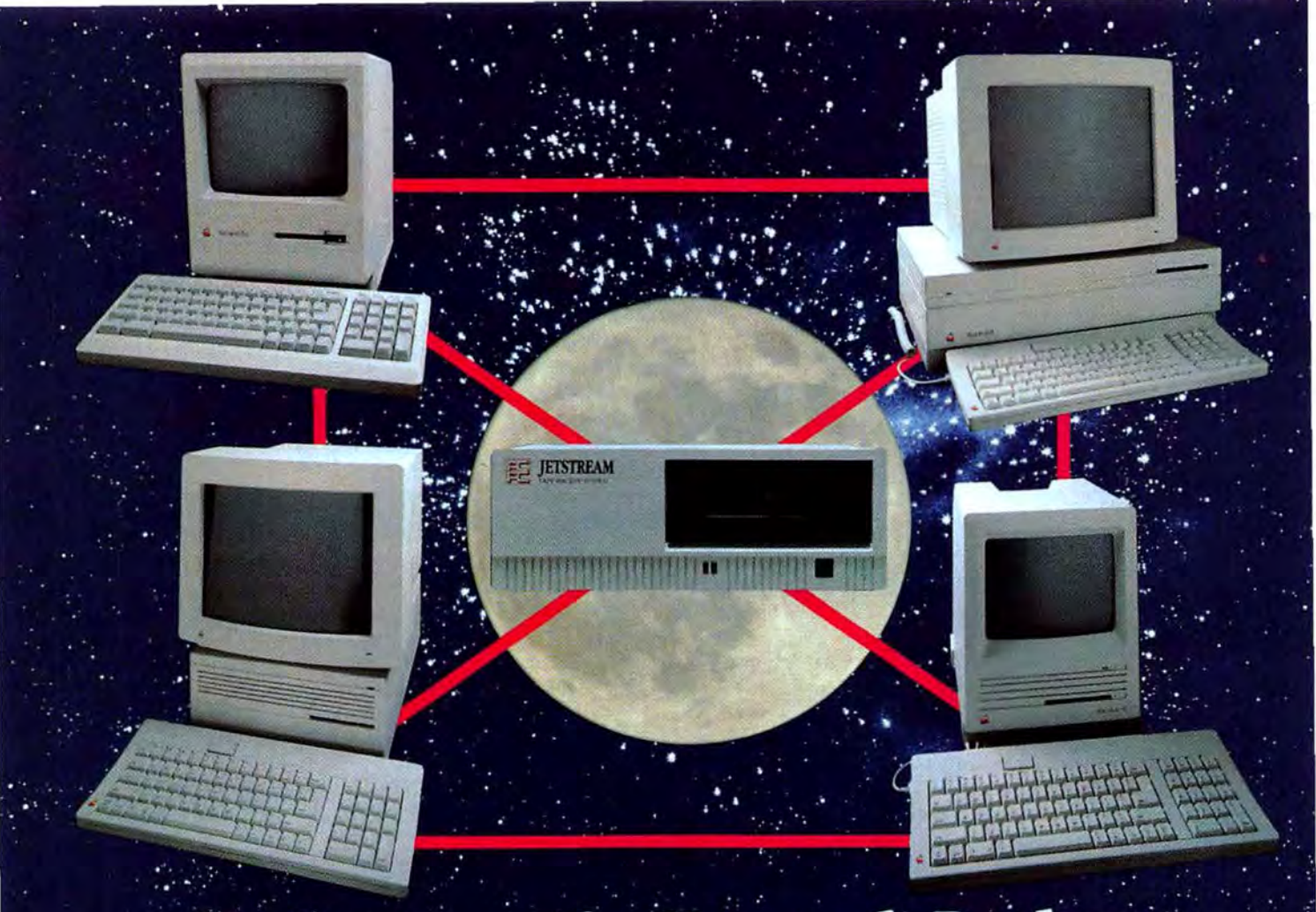
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Hide and Seek Data

The secret is out. See what you can do with HyperCard's hidden fields.



I discovered the value of hidden HyperCard fields in the usual way — I was desperate. My company needed a system to track more than 200 publications that we contacted on behalf of our clients. In addition to the basic information, such as the publication's name, address, and phone number, we needed to track changes in editorial personnel to keep our mailing list up-to-date. We also wanted to keep a detailed record of each contact with each publication.

Media contact is a demanding job that requires a person's full attention. Many of the people who would be using the system had never used a computer before, so we had to keep this system as easy to use as possible to let our people concentrate on their work without having to worry about how to use the system. The problem was finding a way to fit everything onto a single screen while avoiding the cluttered look all too common in microcomputer applications.

It seemed like an ideal project for a relational database such as ACIUS' 4th Dimension or Fox Software's FoxBASE. The Publications file was related to the Editors file. Each contact note was related to an editor, who was

ILLUSTRATION: MARK W. SWEENEY

By Leonard A. Hindus

related to a publication. We turned first to 4th Dimension, which seemed to offer the features we needed. Unfortunately, 4th Dimension had trouble uniting these elements onto a single screen. Although it could display all the information on a screen, it would not let users enter and edit the information without flipping back and forth between files. We had a similar problem with FoxBASE.

Both ACIUS and Fox assured us that we could solve this problem through custom programming in their procedural languages, but we learned the hard way that it can get expensive very quickly, especially if you have to pay a programmer to learn a proprietary procedural language. One of the reasons we became a Mac shop was to avoid custom programming.

I was running out of both time and money when I decided to try to hack together a temporary solution with HyperCard. Since most everyone who has a Mac has HyperCard, I figured I could always find someone who already knew HyperCard if I ran into a problem. So I went out and bought a couple of "HyperTalk for total idiots" books, figuring that I met the basic qualifications. I also spent a few hours listening to the HyperEasy tapes from Personal Training Systems. Much to my surprise, HyperCard wasn't all that hard to learn. It looked like it could do nearly everything we needed — except it was limited to the size of an SE screen.

Ten minutes with the Information Exchange stack (available to Macintosh developers), and I knew that I could design a HyperCard application with many of the features of a relational database. The answer had been in front of me all the time — I just hadn't been able to see it. The features I needed were hidden beneath the surface in the form of hidden fields and buttons.

Beneath the Surface

Hidden, or *pop-up,* fields add a new dimension to HyperCard — data storage in depth. The size of the HyperCard window places a severe limit on the amount of data you can *display at one time,* but there is no practical restriction on the amount of data you can *store* in each card. Each field can hold up to 35,000 characters. You can define up to 1,000 buttons and 1,000 fields per card or background. You simply store the additional information beneath the surface in hidden fields. Buttons, which can also be hidden when they are not needed, let users control which hidden fields show up at any time.

Designing HyperCard applications that use hidden fields is surprisingly simple. Two HyperTalk commands, Show and Hide, combined with the ability to define scrolling fields of any size within the card window, make it easy to control the display of information in HyperCard. The Show and Hide commands in background scripts control the initial card display, and button scripts let users interactively display or enter information in hidden fields.

One of the major advantages of using hidden fields is that *all* the data relating to a card is stored in the card itself. When you back up your stack or transfer a stack from one Mac to another, all the data goes with the card. There are no links that can be broken or other opportunities for the data to somehow become separated or lost.

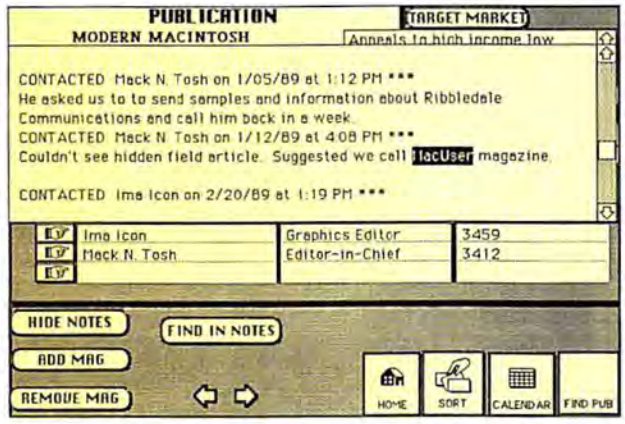


Figure 1: You can hide lots of information in hidden notes fields in HyperCard. In this contact card, you enter new notes by clicking on the buttons (hand icons) to the left of the Names field. When the Notes field is visible, the Hide Notes button replaces the View Notes button. Note that the object of a search is highlighted in the hidden field.

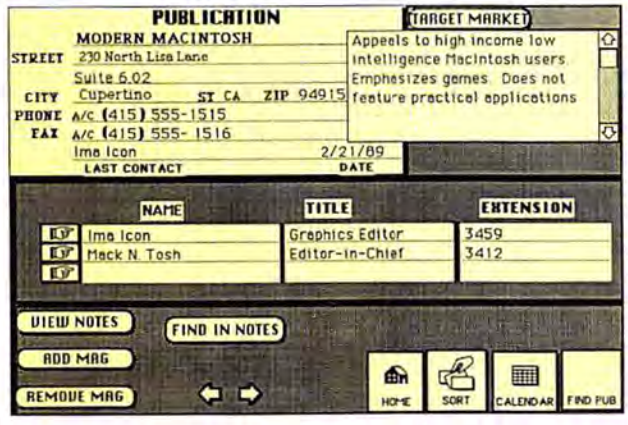


Figure 2: In this stack containing data on various publications, you can click on Target Market to access another hidden field.

Hidden but Not Forgotten

HyperCard functions such as printing, exporting, or searching make no distinction between displayed and hidden fields. A hidden field is simply a field that doesn't happen to be showing at the moment. The data in the hidden fields is always there; it just isn't displayed. Hidden fields are just as much a part of a card as visible fields are.

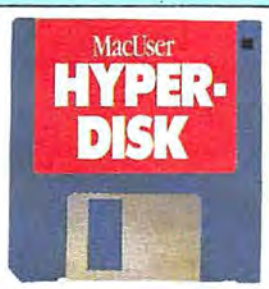
This distinction can, at times, be the source of confusion. For example, the Find function will locate strings in hidden fields, but it will not automatically display those hidden fields. If you then display the hidden field, the found string will not be highlighted. This can result in a Find that displays a card but does not highlight anything. So it is a good idea to have search buttons with scripts, rather than use the message box for searches.

There are several ways to avoid the "Find in hidden field" problem. The simplest is to limit the search to select-

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ed fields you know will be displayed. For example, this script is what I used for my "FIND PUB" button:

```
on mouseUp
    ask "name?"
    find IT in field MAG
end mouseUp
```

This script prompts for the name of the publication to look for by using the HyperTalk **ask** command. HyperTalk stores the user's reply in the variable **IT**. The second line tells HyperCard to restrict the search to just that **MAG** field, rather than the entire card.

When you want to search for a string in a hidden field, or if you want to search the entire card, you can write a script that tells HyperCard to display that field. The field in which the string is found is the *foundfield*. The string that was found is the *foundchunk*. In your script, tell HyperCard to show the foundfield and select the foundchunk. The script shown below illustrates this technique.

This script also prompts the user for the search string by using the HyperTalk **ask** command and places the string in the variable **IT**. If **IT** is empty, then the user didn't type anything, so there's nothing to search for.

If **IT** is not empty, HyperCard is to find the string stored in the variable **IT** but to limit the search to the field **NOTES**.

In a successful search, the field in which the string was found is identified in the foundfield. If the search was not successful, foundfield remains empty. If foundfield is empty, HyperCard is instructed to let the user know by beeping once and answering NOT FOUND IN NOTES FIELD and, finally, to quit.

If the search is successful and there is a field name in foundfield, the computer will beep twice to let the user know. We've instructed HyperCard to hide the "VIEW NOTES" button and replace it with the "HIDE NOTES" button. Notice that we had to specify that these were background (bg) buttons. HyperTalk assumes that an unspecified field is a background field, but it also assumes that an unspecified button is a card button.

I wrote the initial Publication Tracking Stack in one weekend.

```
on  mouseUp
      ask  "WHAT  DO  YOU  WANT  TO  FIND?"
      if  IT  is  empty  then
            exit  mouseUp
      else
            set  cursor  to  busy
            find  IT  in  field  NOTES
      end  if
      if  the  foundfield  is  empty  then
            beep
            answer  "NOT  FOUND  IN  NOTES  FIELD"
            exit  mouseUp
      else
            beep  2
                  hide  bg  button  "VIEW  NOTES"
                  show  bg  button  "HIDE  NOTES"
                  show  the  foundfield
                  select  the  foundchunk
      end  if
end  mouseUp
```

The Show command makes the foundfield visible. (In this case, it must be the field **NOTES** because the FIND was limited to that field.) Since Find does not highlight strings found in hidden fields, you use the Select command to highlight the foundchunk. The Select command must come at the end of the script. Otherwise, HyperTalk deselects the string while executing the next command.

You can check to see if a field or button is currently displayed by examining the visible property of that field or button. If its value is *true*, the field or button is displayed; if it's false, it is hidden. Setting the visible property of a field to true is the same as issuing a Show Field command, and setting the visible property of a field to false is the same as issuing Hide Field. You can use the visible property of the field in **IF** and other conditional-logic statements. You can also reverse the visibility by setting the visible property of a field to the not-visible property of that field.

Who's on First?

HyperCard has a strange concept of layering that controls which button or field appears over or under another. The documentation says that the same Bring Closer and Send Farther commands on the Options menu control both the overlay order and the prompting order in fields. Holding down the Shift key while giving these commands tells HyperCard to bring the button or field all the way to the top or bottom layer. In most cases you will want hidden fields to overlay everything when they are displayed.

We have developed several conventions that are not required by HyperTalk but that help make the scripts easier to read and debug. For example, HyperTalk permits field and button names to be either uppercase or lowercase and does not require quotation marks unless the names have more than one word.

We try to use single-word field and button names whenever possible. If a field or button name is a single word, we type it in uppercase without quotation marks. If a field or button name has more than one word, we put quota-

tion marks around it so HyperTalk will know it is one name.

HyperTalk assumes that a field is a background field unless it is identified as a card field. For this reason, we never use the same name for both a card field and a background field. Unfortunately, HyperTalk does not make the same assumptions for buttons. You must identify background buttons in HyperTalk scripts.

If more than one person in your organization will be writing or modifying scripts, it is a good idea to establish and post your own conventions.

You can add buttons and fields to cards and backgrounds at any time. You can also modify existing scripts or write new scripts whenever you want, which lets you perfect your HyperCard stacks over time. In our case, I wrote the initial Publication Tracking Stack in one weekend, but we have added several features since then.

Always back up your stack before making any changes whatsoever. HyperCard lets you do things to your cards and stacks that you cannot reverse. This caveat is especially critical when you modify a stack that is currently in use. For example, changes you make to a script cannot be undone once you have clicked on the OK button. Changes you make to a button or field cannot be undone at all.

HyperCard issues a warning only when you delete a field. You can reverse a single paint or text change by using the Undo option on the Edit menu (Command-Z), but the Undo is limited to only the most recent change. I have found out the hard way how easy it is to make unintended changes in HyperCard.

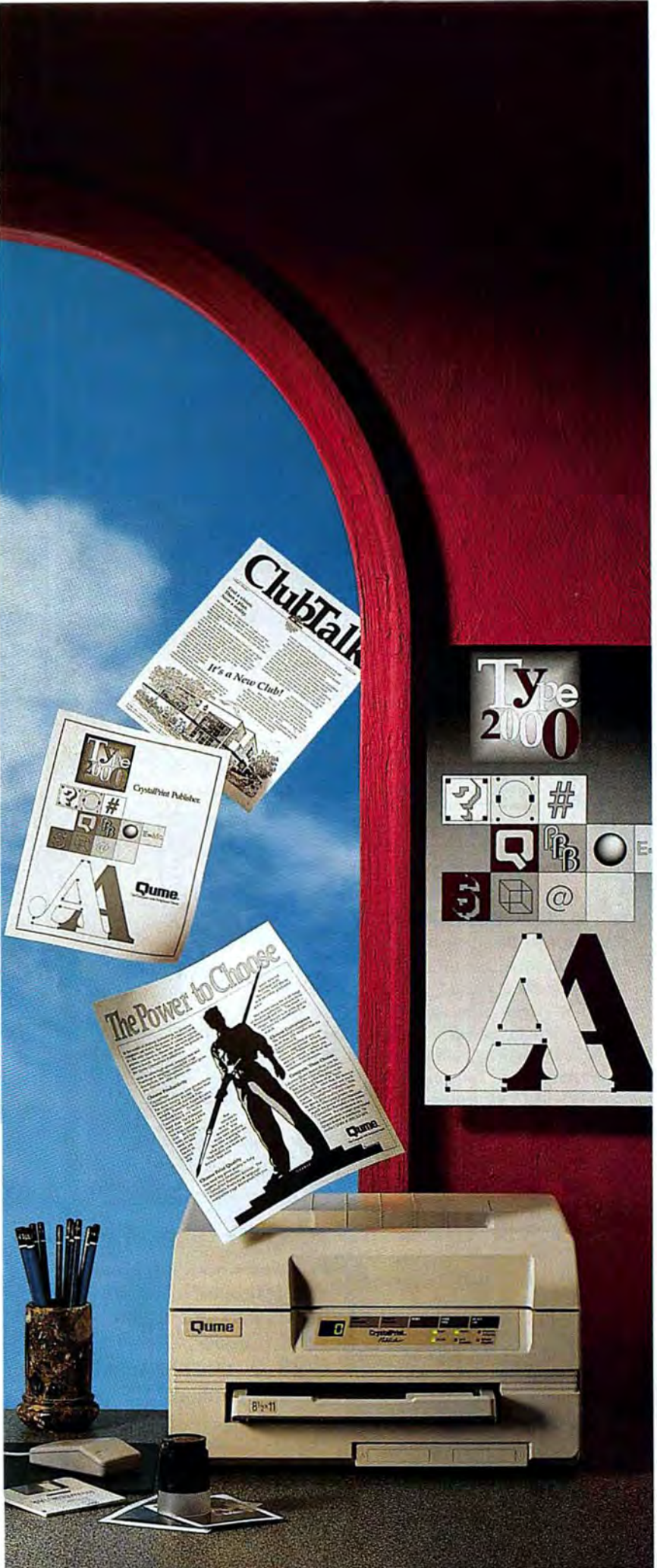
Relating to HyperCard

Despite the success of this application, I'm by no means a HyperCard fanatic. HyperTalk is as fussy, cantankerous, and inconsistent a computer language as I've ever seen. The documentation seems intended to keep many of the features as hidden as the fields that made this application possible. On top of that, HyperCard throttles my large-screen color Mac II down to a black-and-white window the size of an SE screen.

Despite all its inconsistencies, limitations, and peccadilloes, however, HyperCard lives up to its claim of being programming for the rest of us. Instead of the days — and dollars — I had expected it would take to develop this application using a relational database, I developed it myself in only about ten hours with HyperCard.

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Evolution of a Software Species



This month: a cautionary report on the stackware market, wild speculation about a new programming language that might or might not be secretly in development in public, hints on replacing the features of the Finder with a hacked-up Home stack — and to start with, a tongue-twisting aphorism: saws still slice when saw sales slump.

It's not a big slump, but there does seem to be a slump, so this may not be the best month to hock the Volvo and become a stackware author. As I write this, signs of softening in the stackware market are evident: publishers are buying less and apparently selling less. HyperTalk author Dan Shafer, discussing this stackware softening on CompuServe recently, observed, "Software publishers interested in HyperCard stacks have dwindled to a precious few. New ones don't seem to be coming on-line. Book sales are way off. Not just on my titles but on the total as well. MacNET dropped its HyperCard-only forum back to a subset of the Mac forum. Upload rate here is way, way down. It sure seems from here like the bloom is off the HyperCard rose, at least for the moment."

As I write this, signs of softening in the stackware market are becoming evident.



By Michael Swaine

Dan should not attach too much significance to the fact that sales of his HyperTalk book have slackened (as have sales of mine). The *Hyper's* Index statistics tell the story (numbers only approximate):

Number of HyperCard/HyperTalk book titles customers have to choose from: 357.

Number of American car makes: 18.

The rest of Dan's evidence, though, is significant, if not surprising.

The cynics' predictions that the stackware market would turn out to be every bit as exciting as the template market for Lotus' 1-2-3 have largely been borne out. I'm pretty sure that this softening isn't what Microsoft chairman Bill Gates meant when he called for "softer software," and in fact it is distressing news for those who saw the stackware market as something grander. There are certainly opportunities for those with well-executed original ideas, but don't expect to make money on stacks without such an edge.

But the original blade is still sharp. HyperCard itself grows more useful and more interesting every day, with products such as SuperCard from Silicon Beach and CompileIt! from Heizer Software not only extending the capabilities of HyperCard but also suggesting possible lines of evolution for this entire species of software.

Part of what HyperCard is about is empowering users, giving them more control over the machine. In that light, HyperCard is more useful today than ever and as interesting for what it foreshadows as for what it embodies.

User programmability, for instance, is likely to be much more important in the next few years over the whole range of Macintosh software. Expect to see moderately sophisticated users customizing application programs, system utilities, and even elements of the operating system itself. If you don't like the way a program works, you'll be able to change it (sometimes). User programmability is possible today in isolated and incompatible instances, but there will be market pressure on all personal-computer manufacturers, and especially on Apple, to standardize and universalize the capability. That is, Apple is going to feel pressure to provide a universal user language that (1) is bundled as part of the system software, (2) is easy to learn and to use, and (3) gives users unprecedented ability to customize the system and applications.

Apple's uncharacteristic openness to others who want to make use of — and money from — the HyperCard user interface suggests that HyperCard is more than a product to Apple. Symmetry's HyperDA and SuperCard extend HyperCard in ways Apple would lay claim to if HyperCard were a conventional product.

HyperCard (or its programming language, HyperTalk) isn't a universal user language. It may, however, be Apple's test case for such a language. Perhaps the efforts at HyperCard standardization that are under way (and that include representatives from Silicon Beach) have implications that go beyond HyperCard.

HyperCard provides a great deal of user control, but it isn't the user language I'd like to see. One reason is that it's restricted to a subset of the Mac environment. As long as you're content to work within the domain of stacks, you can customize your environment like a '57 Chevy.

Unfortunately, the applications you need to use are not stacks. A problem with the stackware market is that so much stackware is utility software, and utilities have utility only to the

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extent that they're immediately accessible when you need them — while you're using an application. DAs meet that criterion, and stacks don't unless you have enough free memory to keep HyperCard open under MultiFinder, or unless you use HyperCard as a Finder substitute.

The former possibility is fantasy; nobody has extra memory these days. The latter is more plausible, and many people have taken it seriously, developing Finder-substitute stacks. If you could launch all your applications from HyperCard, never entirely leaving HyperCard, you would have two advantages: you would have relatively quick access to utility stacks, and you would have at least a portion of the flexibility of that universal language. Although you couldn't use HyperTalk to customize your applications, you could modify your system environment, because HyperCard itself would be your system environment, your desktop, your Finder.

Many stackware authors have written Finder substitutes, but I haven't found one that feels right to me. I suspect it's because, apart from the interesting possibility of creating turnkey systems that are deliberately limited, developing a Finder substitute stack may be more a project for tinkerers than a product for customers. What about us tinkerers? How much of the Finder can be HyperCarded?

In my house are two Macintoshes: a Macintosh II and an SE. The Macintosh II normally has MultiFinder active but, with only 1 megabyte available, that's not practical on the SE. On the other hand, the SE is used with only a few applications. Here, for my purposes, using HyperCard as a launcher seems to be the most flexible approach, allowing me to invoke applications and stacks reasonably quickly.

XCMDs and XFCNs (external commands and functions, which I discussed last month) are the key. New externals are appearing all the time, and anyone interested in acquiring them should check the electronic services for the latest. Here are the system capabilities I find I need on the SE, and the XCMDs and XFCNs that give HyperCard those capabilities:

Launching applications. HyperCard already has the ability to launch applica-

tions both directly and through documents created by those applications, but Steve Maller's FileName XFCN (available from APDA) is an improvement that most serious stack developers use. The following button scripts use FileName to invoke a file dialog box and either launch an application or go to a stack, respectively:

```
on mouseUp
 get FileName ("APPL")
  if it is not empty
  then open it
end mouseUp

on mouseUp
 get FileName ("STAK")
  if it is not empty
  then go to it
end mouseUp
```

Launching an application by selecting a document created by it is also possible but more complicated. In this case, you have to put the file type specific to the application into the parentheses.

There are at least as many such file types as there are applications, so this technique can get messy. You can open pure text files, though (with a word processor — MacWrite, if available), by using the TEXT file type.

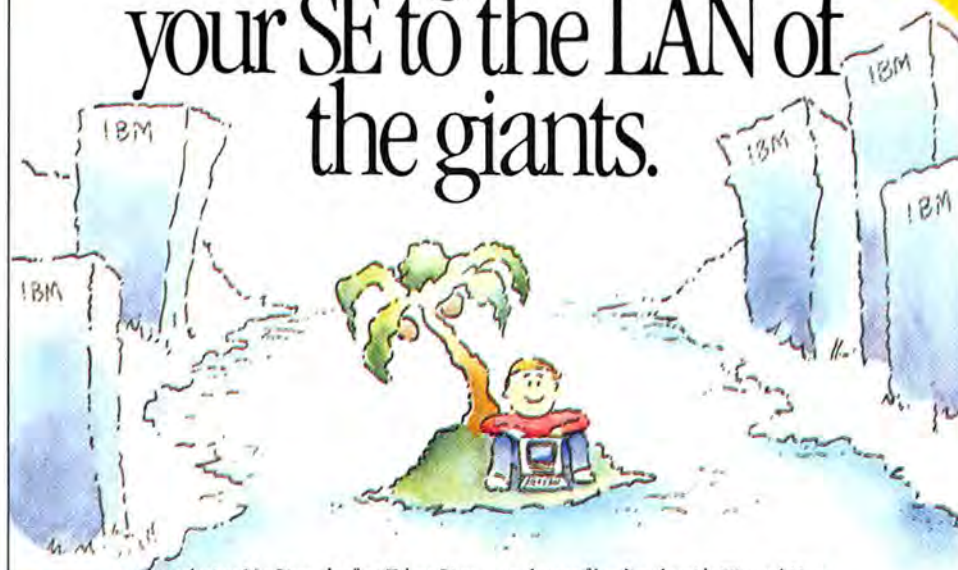
Managing files and volumes. AnalytX (P.O. Box 388, Southampton, PA 18966; (215) 750-0792) has a set of licensable externals that perform most of these housekeeping tasks, including RenameFile, DeleteFile, Ejector, and NewFolder. All these functions and others are packaged in an AnalytX external named FileManager, which lets you move, rename, delete, or copy files, and create new folders. The price of licensing these externals ranges from $25 to $75.

Getting system information. Various developers have written information externals; I'll mention AnalytX's FileSize and FileInfo, as well as its AboutMe XCMD, which helps stacks document themselves.

Bailing out. Finally, there are externals that execute a system restart or shutdown —and that's my cue to click in the GoAway box for another month.

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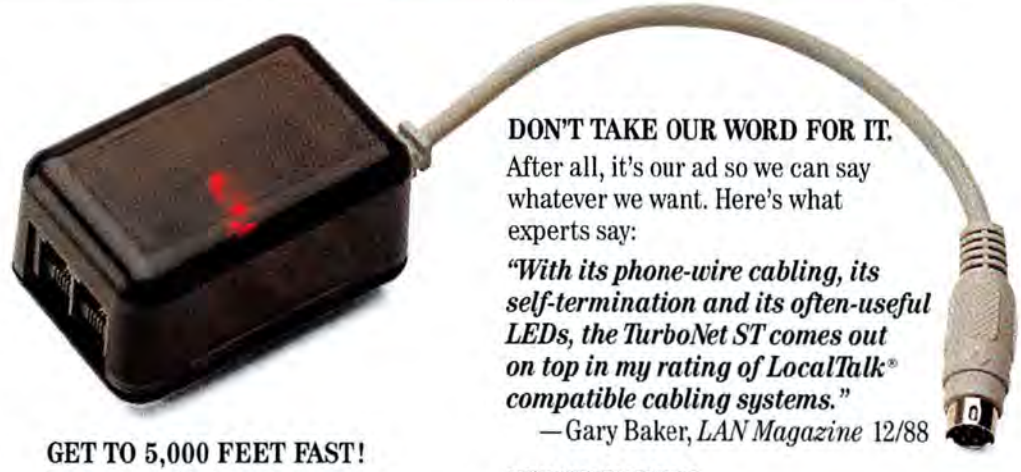
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▶ $59.95 Suggested Retail	✓	✓

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BRIDGES

Things are heating up for Apple. Both Sun and NeXT made announcements recently that threaten to change the ground rules for the Mac II. Seen for the first time publicly was Sun's long-rumored "SPARCintosh." Sun calls it the SPARCstation 1, and it's a 12.5-mips RISC-based workstation designed for the desktop, priced almost identically with the Mac IIx and IIcx, with which it competes. Sun also unveiled the new Sun-3/80, a 68030-based machine costing nearly $2,000 less than the Mac II, and new graphics coprocessor cards that allow Sun's new machines to display complex graphics at blinding speed. Steve Jobs' NeXT announced a new distribution arrangement with Businessland, which should move his highly praised and publicized machine more into the mainstream. Will these new offerings unseat the Mac on the desktop? Read on.

WRITE TO

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EDITED BY HENRY BORTMAN

NeXT

NeXT has announced a major distribution arrangement with Businessland to sell the NeXT workstation in the commercial market. For $9,995, Businessland will sell the "cube" (including a 256-megabyte optical drive and bundled software but with no printer or hard disk) to the public, while NeXT continues to sell only to higher education.

This about-face comes less than six months after Steve Jobs introduced the computer, claiming that NeXT had no intention of targeting the business market anytime soon. In announcing the Businessland agreement, Jobs explained that commercial distribution would make the machine a more attractive long-term investment for student purchasers and software developers.

Novell and Aldus have added their names to the growing list of companies developing products for the computer. This roster includes Adobe (Illustrator), Frame Technology (FrameMaker 2.0), and Relational Technology (INGRES relational database). IBM has licensed NextStep, NeXT's user interface and development environment, and is reported (by Jobs) to be "heavily committed to it."

Jobs claimed that announced software would be available by the end of 1989, since NextStep greatly simplifies the task of programming a graphical user interface. That has been the most time-consuming part of developing Macintosh software and continues to be the Achilles' heel for other manufacturers (especially Sun) that are trying to make UNIX a business alternative. If NeXT is able to deliver mainstream productivity software for its machine, the battle for the desktop will get interesting indeed.

NeXT is at 3475 Deer Creek Road, Palo Alto, CA 94304; (415) 424-0200.

— James Finn



Compatible Systems Corporation

Have you been wishing for faster network performance than what LocalTalk can provide but can't afford Ethernet on the Mac? Well, the bottom line has just moved down a notch. Compatible Systems has announced Ether+, an external SCSI-to-Ethernet adapter that breaks the $500 price barrier ($495, to be precise), which is what the most expensive Ethernet products for DOS machines cost. Ether+ provides both standard and thin Ethernet connections but, unfortunately, does not support twisted pair — yet. Contact Compatible Systems Corp. at P.O. Box 17220, Boulder, CO 80308; (800) 356-0283 or (303) 444-9532.

— Henry Bortman

Baytec

If 10-megabit-per-second (mbps) Ethernet isn't fast enough for you, how about 200 megabits? Fiber optics? Nope. SCSI.

Baytec is offering a new networking scheme, Baytec 2000, that connects Macs and other SCSI-equipped computers to a central file/printer/plotter server with tape backup and allows them to transfer data at SCSI speeds. It supports the Mac OS, DOS, UNIX, and Xenix. It's not exactly AFP-compatible — you have to run a separate application to mount a volume — but it does provide network-management software and password security. It's not cheap either. Baytec says the cost of a typical 20-user system is around $54,000. Don't look for it to replace LocalTalk, but within a CAD/CAM work group whose members frequently transfer large files around, for example, it could certainly find a niche. For more information, contact Baytec at 32425 Schoolcraft, Livonia, MI 48150; (313) 427-1250 or (313) 580-3146.

— Henry Bortman

Baytec 2000 isn't cheap, and it won't replace LocalTalk, but for some work groups it could certainly find a niche.

Telebit

If you're looking for high-speed telecommunications but don't want to sacrifice compatibility with industry standards, you ought to check out Telebit's new T2500 19,200-bps modem. This $1,695 product is fully compatible with Telebit's Trailblazer and other PEP products, as well as with modems that implement V.32 and lower speed standards. You can contact Telebit Corp. at 1345 Shorebird Way, Mountain View, CA 94043-1329; (415) 969-3800.

— Henry Bortman

DataViz

MacLinkPlus/WangVS extends the power of its MacLinkPlus translators to include Wang systems. DataViz supplies translation software for a variety of word processors and spreadsheet programs on Macs, PCs, and VAX VMS machines. Now Mac users can log directly on to a Wang system and run Wang applications or transfer Wang files to the Macintosh and translate them to Mac software formats. DataViz is also shipping a version of MacLinkPlus/Translators that is able to read DOS disks directly in Apple's SuperDrive. Contact DataViz at 35 Corporate Drive, Trumbull, CT 06611; (203) 268-0030.

— Henry Bortman

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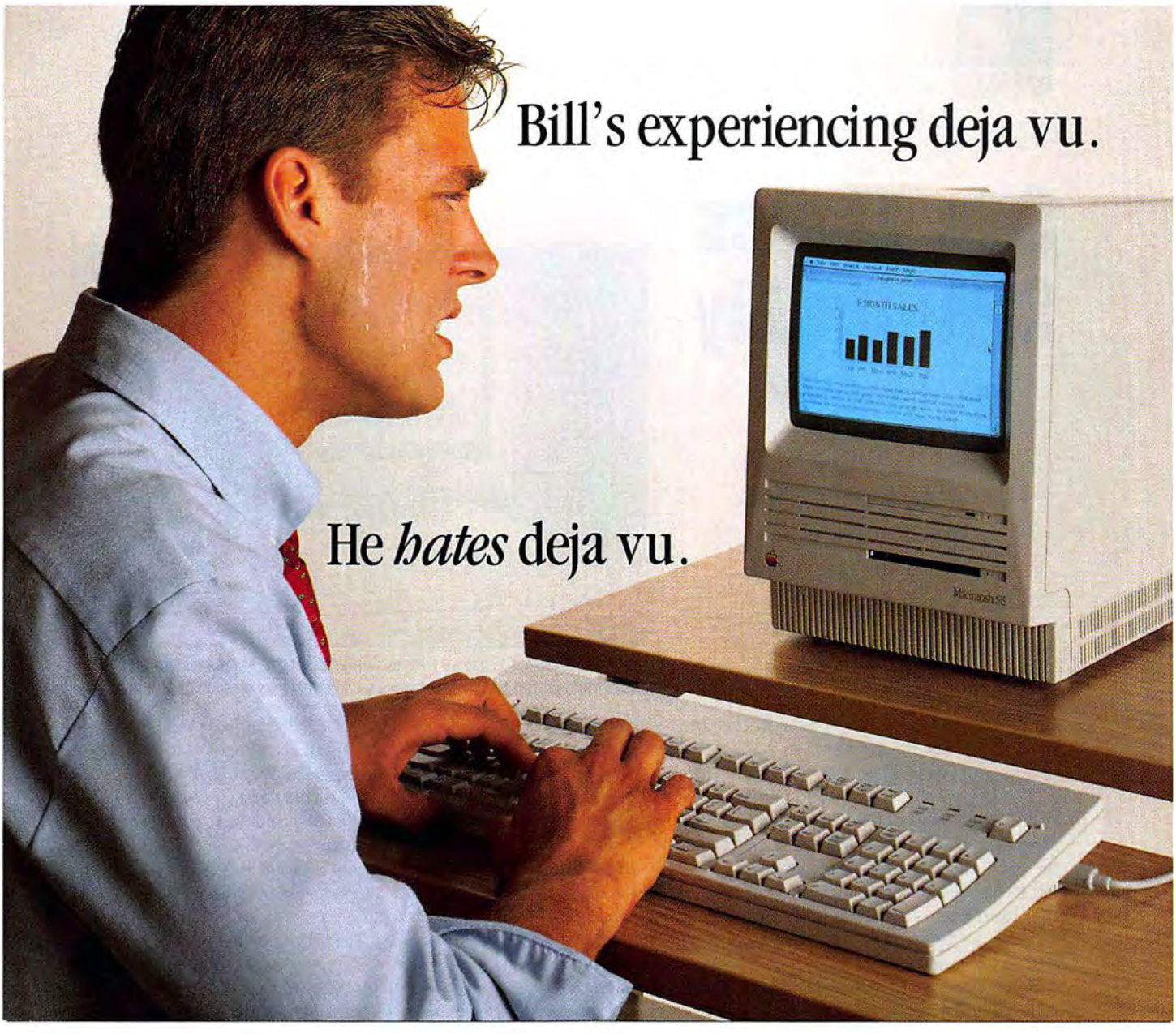
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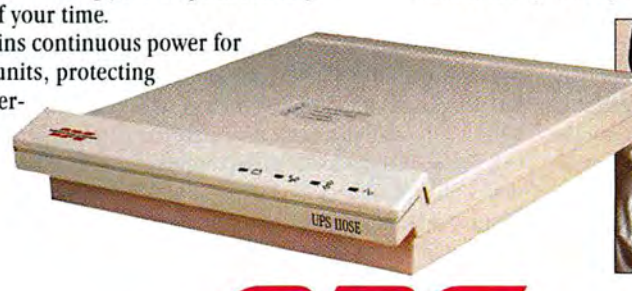


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Sun Makes SPARCs Fly

Sun Microsystems unveils a host of new CPUs and graphics processors — but can they unseat the Mac on the corporate desktop?



Sun's SPARCstation 1, shown running SunWrite, packs amazing power into a petite package, but few Mac software developers have pledged to support it yet.

Rumors circulated widely for months that Sun was working on a "SPARCintosh." It was reportedly a workstation that could compete head-to-head with the Mac on the basis of price and user-friendliness and then blow it out of the water in terms of performance — a machine that could dislodge the Mac from its favored position on the desktop.

In April, Sun finally announced part of its new line, which includes the $10,000 SPARCstation 1; a 68030-based workstation, the Sun-3/80; and a host of other products. It also unveiled SunWrite, SunDraw, and SunPaint, three user-friendly applications, and displayed its new OpenWindows user interface and windowing standard for application software running under AT&T System V UNIX.

These new products will definitely enhance Sun's position as the leader in the workstation market, particularly for complex graphics and engineering applications. But will corporate executives rush to strike orders for desktop Macs from their budgets and to replace them with the new Sun machines? Not yet, and certainly not until Sun can attract a new breed of productivity software to its computer systems.

Heavy Silicon

All in all, Sun introduced six new CPUs. Three of the new machines are based on Sun's SPARC architecture (see sidebar, "RISC-y Business"); the other three are built around the same Motorola 68030 chip that lies at the heart of the Macintosh SE/30, IIx, and IIcx. Some of these new hardware platforms are desktop machines, others are high-powered 3-D workstations, and others are servers. We'll focus on the desktop and workstation models.

The 68030-based Sun-3/80 comes closest to matching the features, price, and performance of the Macintosh II (x or cx). Its base configuration includes a CPU, 4 megabytes of RAM, built-in Ethernet, and a 17-inch monochrome monitor with a 1-bit video card. This package retails for $5,995 and comes in a box that is all of 2.5 inches high — the CPU itself is so thin that the disk drive has to be mounted on the side so the keyboard won't obstruct it.

But the package lacks a 3.5-inch floppy-disk drive and a hard-disk drive. Sun offers an optional floppy-disk drive — there's room for one — for around $250; a 104-megabyte drive is $1,995, and you can install up to two. The basic working system retails for around $8,000. A variety of monitor and video-card options is available, including a very fast graphics coprocessor, the GX accelerator, that may end up being the most significant part of the package (see sidebar, "The Color of Speed").

The SPARCstation 1 comes in an identical physical package but contains Sun's SPARC processor, which, although rated at the same clock speed as the 68030 in the 3/80, chews up code more than four times as fast (see sidebar, "RISC-y Business"). This machine also introduces a new bus — the SBus — that packs an extraordinary amount of power into a 3-x-5-inch circuit-board design. In fact, the circuit design of the SPARCstation is remarkable: 10 VLSI chips replace innumerable components on the surface-mounted boards and allow this CPU to speed along at up to 12.5 million instructions per second, using fewer than 50 chips. That's fewer than a Macintosh II or even an IBM Model 30 has, which contributes to Sun's low manufacturing costs and the company's predictions of high reliability.

This machine is *fast*, especially when coupled with a graphics coprocessor. (The GX accelerator works all the way up and down the Sun line.) It's also *inexpensive*.

By Henry Bortman

In terms of similarly configured systems, this machine's price is halfway between that of a Macintosh IIcx and a IIx (see table, "The Bottom Line"). The power of the SPARCstation 1 will make it harder for Apple to get the Mac accepted as a high-end graphics workstation for performing such specialized tasks as computer-aided design/computer-aided manufacturing, 3-D modeling, and image processing.

Where's the Spreadsheet?

It's not so clear, though, whether the SPARCstation will be able to challenge the Mac on office desktops. It's great to have fast processors, and for many high-end uses it's essential. But unless Sun has a host of developers waiting in the wings to port their software to its platforms — the paucity of such announcements justifies skepticism — all the raw processing power in the world is not going to turn Sun-3s or SPARCstations into desktop machines. One important exception to the developers' silence was Informix, which announced plans to port its Wingz spreadsheet program to OpenWindows, running on Sun-3s, SPARC machines, and the 386i (it didn't commit itself to a shipping date, though). And WordPerfect has already ported its best-selling word processor to UNIX.

Sun says that of the 2,300 applications available for its 680x0 family of Sun-3 workstations, nearly 500 have already been ported to run on SPARC machines. The company claims that porting an application from one platform to the other requires only a simple recompile. The pace at which these conversions take place may well determine how quickly the faster RISC-based machines replace Sun-3s.

Even if all these thousands of applications are ported to the new platform, however, they remain concentrated in the specialized categories of high-end graphics and engineering work. They're not the basic day-to-day productivity tools that business users require. To challenge the Mac on the desktop, the latter applications are the ones Sun, or its third-party developers, must provide.

Sun intended to address this problem with its springtime flurry of desktop-software announcements. OpenWindows is an implementation of Sun and AT&T's OPEN LOOK interface built on the industry-standard X Windows and Sun's NeWS (Network/extensible Windowing System). Sun and AT&T are promoting this user interface — their proposed way of displaying scroll bars, menus, buttons, and the like — as an industry standard and are even putting it into the public domain, hoping that everyone will use it.

The problem is that most of the rest of the industry — including Apollo, DEC, Hewlett-Packard, and IBM — has agreed

RISC-y Business

Computer users crave speed and performance. RISC is the latest trend in processor design, one that has ushered in a new era of desktop machines that are five to ten times faster than a Mac II. RISC stands for *reduced instruction set computer*, an approach to processor-architecture design that grew out of research at IBM, the University of California at Berkeley, and Stanford University.

The Motorola 680x0 series of processors of the various Macintosh models, and the Intel chips that power DOS machines, are all examples of CISC *(complex instruction set computer)* architectures. These chips include many complex instructions that support high-level programming languages such as Pascal. The result is that simple instructions, such as an instruction to copy a number from one location to another, can be executed in a single clock cycle; more-complex operations may take several cycles. For example, the 68020 averages about eight cycles per instruction.

In RISC design, the goal is to have each instruction execute in a single clock cycle. To this end, the instruction set is reduced to the most commonly used simple instructions. Why, you may ask, does that make things faster? Operations that involved only one instruction on a CISC processor may now require several instructions on a RISC machine, so where is the gain?

RISC wins because its simplified design lends itself well to optimization. It uses pipelining, an "assembly-line" technique in which parts of different instructions are executed in parallel. To execute an instruction, the processor must first fetch it from memory and then decode it (to figure out what kind of instruction it is: add or multiply, for example). With pipelining, one instruction can be executed while the next instruction is being decoded and the one after that is being fetched. The uniformity of instruction execution time in RISC allows efficient feeding and synchronizing of this assembly line.

With instructions executing rapidly, slow memory speed becomes a bottleneck. RISC designs use more registers (a small number of very fast memory locations built into the processor) than CISC architectures do and rely on optimizing compilers to keep needed data in registers, thereby minimizing references to slow system RAM.

Typical CISC programs use simple instructions most frequently. In moving a program to RISC architecture, it may grow by 20% or so, since certain CISC instructions require several RISC instructions to emulate them. But the optimized RISC machine may average 1.3 clock cycles per instruction, with the CISC averaging 8. This clock-cycle differential more than compensates for the modest increase in program length, resulting in a significant increase in speed.

So far, RISC processors have seen use primarily in UNIX machines. Sun's entry into the RISC market is called SPARC *(scalable processor architecture)*. Sun does not manufacture SPARC processors but rather licenses the architecture to companies that design chip sets based on its specifications.

There are other big players in the RISC game. Perhaps the most formidable is MIPS, whose RISC chips are now being used by DEC, Silicon Graphics, and Sony, among others. MIPS' chip has been around longer than SPARC, and MIPS has the most advanced optimizing compilers.

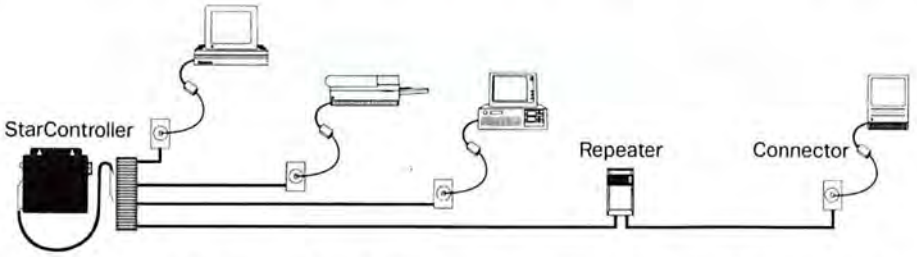
Motorola's 88000 RISC family is now widely available and may become another contender. Apple is rumored to be working on a port of the Mac's operating system to the 88000 family, entrancing the speed demons among us while raising serious fears about the future compatibility of existing Mac software. Since our current operating system was written specifically for the 680x0 family of processors, changing processors now could be a wrenching experience. NeXT time you bemoan Apple's lack of leadership here, consider just how treacherous this mine field really is.

— James Finn

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The Bottom Line

	Macintosh IIcx	Macintosh IIx	Sun-3/80	SPARCstation 1
Processor	68030/68882	68030/68882	68030/68882	SPARC
Clock speed	16 MHz	16 MHz	20 MHz	20 MHz
Instructions per second (millions)	1.5	1.5	3	12.5
MFLOPS (double-precision Linpack)	NA	NA	16	1.4
RAM	1–8 Mb	1–8 Mb	4–16 Mb	4–16 Mb
Expansion slots	3	8	3	3
Graphics accelerator available	no	no	yes	yes
24-bit color available	yes	yes	yes	no
Built-in network	LocalTalk	LocalTalk	Ethernet	Ethernet
Dimensions (w x d x h in inches)	18.7 x 14.4 x 5.5	11.9 x 14.4 x 5.5	16 x 16 x 2.5	16 x 16 x 2.5
Open operating system/user interface	no	no	yes	yes
Price*	$10,745	$11,545	$8,240	$11,240

*Sun systems include CPU, 4 Mb RAM, 17-inch monochrome monitor and card, 3.5-inch floppy and 104-Mb hard-disk drives, Ethernet.
Mac systems include CPU, 4 Mb RAM, 19-inch monochrome monitor and card, 3.5-inch floppy and 80-Mb hard-disk drives, Ethernet card.

Sun's new Sun-3/80 provides more raw computing power than a similarly configured Mac IIx or IIcx but is priced nearly $2,000 below its Apple competition. The price of the RISC-based SPARCstation 1, which delivers up to ten times the power of high-end Macs, is halfway between the cost of the IIx and that of the IIcx.

instead to standardize on Motif, the interface developed by several companies collaborating under the auspices of the Open Software Foundation. And then there is the challenge of NeXT, which offers not only a competing interface but also the relatively easy-to-use NextStep development environment (see Currents). Will vendors of desktop productivity applications want to implement them for OPEN LOOK as well as for Macs, Motif, and NeXT — not to mention Presentation Manager and Windows? Maybe.

SunWrite, SunDraw, and SunPaint are three new applications based on a prerelease version of OPEN LOOK. This trio of products will have a familiar look to Macintosh enthusiasts. Draw and Paint do about what you'd expect, but SunWrite is more action-packed than you might assume. It provides not only a full-featured word processor but also such advanced DTP capabilities as multiple-column creation and auto-flow of text around arbitrarily shaped graphics objects.

One could argue that the Mac started out the same way, but when the Mac was introduced, MacWrite and MacPaint were awe-inspiring innovations. Similar products today inspire more yawns than raised eyebrows. And the market is no longer wide open; in fact, it's rather crowded.

Whether Sun will succeed in the desktop market is not yet clear. But what *is* clear is that its new CPUs and graphics products have proved once again that it has earned its leading position in the workstation market, a position from which it will not be easily dislodged.

The Color of Speed

In addition to a rash of new workstations and servers, Sun introduced a set of graphics frame buffers and accelerators last spring that begin to deliver on the promise of future computing.

The GX accelerated 8-bit-color frame buffer is a new VLSI design that takes the wait out of graphics processing. Forget much of what you know about graphics and image processing on the Mac. Remember watching the hands spin on the watch when you opened an Illustrator or PageMaker file? Remember how reluctant you were to resize a window because you didn't want to wait for the whole image to redraw? GX doesn't work like that. You open a file or resize a window, and — zap! — you see the display. All at once. You don't see every little line being drawn. It's just there. Text scrolling also flies. Amazing stuff. You can rotate 3-D wire-frame images in real time. Shading and volume rendering have tremendous zip.

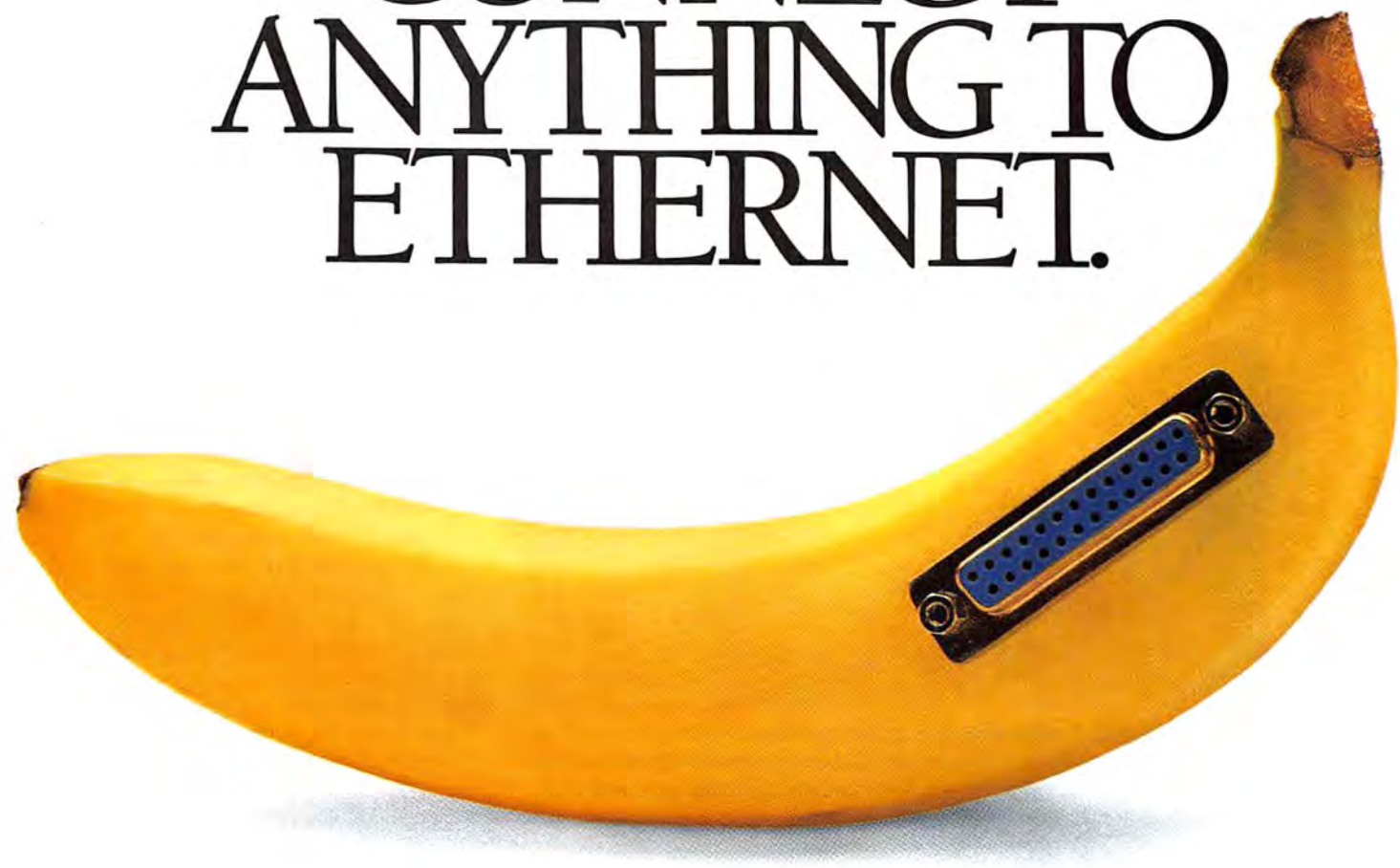
One of the most attractive features of the GX board is that its power is scalable. Most graphics coprocessors work well until they meet a CPU that can outstrip them. Then what is supposed to be an accelerator actually becomes a bottleneck, slowing things down. GX technology is designed to take advantage of whatever speed advantage a CPU offers. Accordingly, it works with any of Sun's new machines. And, despite its power, it won't break your pocketbook. It requires a system with a minimum of 8 megabytes of RAM, but the GX board retails for only $2,000.

The Mac has nothing to compare to this product. Because Apple hasn't let anyone get at the insides of QuickDraw, no third party has been able to develop a general-purpose graphics accelerator for the Mac — and Apple doesn't appear interested in doing so. The closest anyone has come is RasterOps, whose ColorBoard 118, an 8-bit accelerator, is (at press time) available only to developers. The ColorBoard 118 will provide increases of up to 60 times the standard Mac speed on a specific subset of drawing operations, but software will have to be modified to take full advantage of its power.

Sun also announced a 24-bit color-video card, the TC, available as an option on the 3/80 only. It's too early to tell, but this one could put a dent in the Mac's share of the workstation market for color-image processing and, just possibly, DTP.

— Henry Bortman

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Kennect Rapport and Drive 2.4



Figure 1: The Kennect Rapport attaches to the external floppy-disk–drive port of a Mac 512KE, Plus, or SE and allows the internal Mac 800K drive to read MS-DOS and ProDOS 3.5-inch disks. When used in conjunction with Kennect's Drive 2.4, Rapport can write to and format DOS and ProDOS disks as well.

You think there are already enough solutions around for transferring files between PCs and Macs? Look again. Kennect (a company comprising several original Apple II engineers) has come out with a nicely engineered addition to the genre, Rapport. It's small, but it packs a big punch.

Rapport looks like a fat connector similar to the kind on a cable for an external floppy-disk drive (see Figure 1). Except there's no cable. And it has a microprocessor inside. You plug Rapport into the external-drive port of your Mac 512KE, Plus, or SE and drop an INIT into your System folder. Reboot, and you can now use your *internal* 800K floppy to read 3.5-inch 720K DOS and 800K ProDOS disks. It's not a SuperDrive, but then there's no SuperDrive available for these machines.

Unfortunately, DOS and ProDOS disks don't appear as icons on the Mac desktop, as they do with DaynaFile. You have to use the clunky Apple File Exchange to transfer files between them and the Mac-formatted disks. And Rapport doesn't come with the MacLink Plus Translators. If you want to perform any translation other than the standard MacWrite to DCA, which comes with Apple File Exchange, you'll have to buy the additional translator sets yourself from a company such as DataViz.

That's not all this gadget can do. Rapport has two connectors, one at each end. One end plugs into the Mac, and into the other end you can plug an external floppy-disk drive. If that drive is an Apple 800K, Rapport will let you *write* files to the DOS and ProDOS disks you insert into it, in addition to giving you the read capability that you get from the internal drive by plugging in the specialized connector. If you plug a Drive 2.4, Kennect's new 3.5-inch external disk drive, in to Rapport, even more magic happens. You can now read, write, *and format* standard DOS and ProDOS disks (still with Apple File Exchange) — as well as two varieties of high-density Mac, DOS, and ProDOS disks. You've created a SuperDrive clone.

Kennect provides a special format that allows formatting of 800K disks for 1.2 megabytes and pushing of high-density disks to 2.4 megabytes per floppy. Disks formatted this way can be read only by other Kennect Drive 2.4s. It's great for doing backups or for moving large graphics files around the office if you have a pair of 2.4s, but don't try to take a Kennect-formatted disk to your service bureau to output on its Linotronic — unless the service bureau has a Drive 2.4, too.

And what about the poor Mac II, which has no external floppy-drive port to plug Rapport into? Take heart. The II does have internal drive connectors. By the time you read this, Kennect should have a cable that you can plug into the internal connector, route out the back of the Mac, and attach to Rapport. It's a simple cable, the company says. If you call, you can find out how to make one yourself.

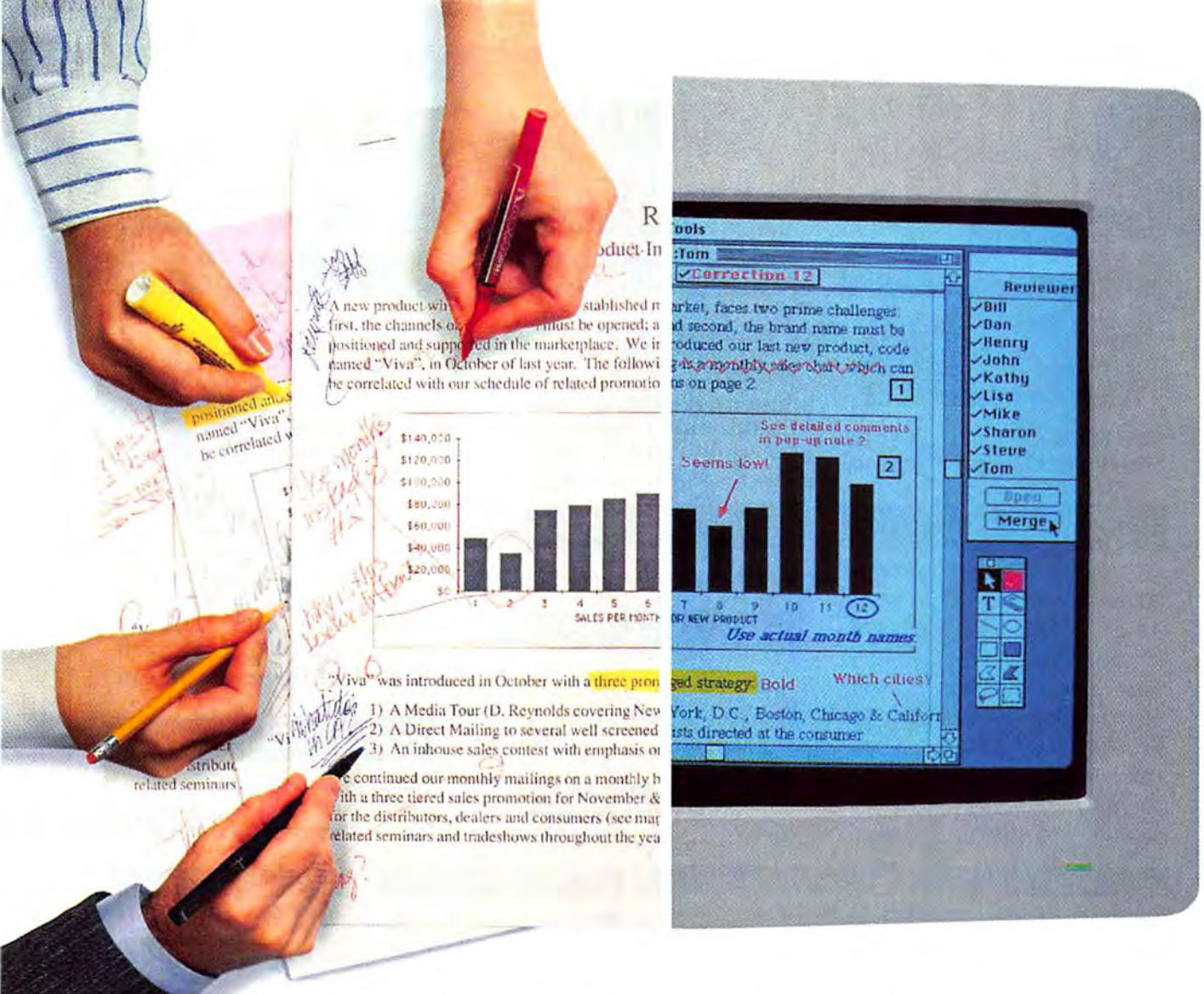
For reading DOS and ProDOS files, this product is a reasonable alternative to the $599 SuperDrive upgrade, since Rapport costs only $299. But if you want full SuperDrive functionality, you're probably better off with the upgrade. It's Apple, and it costs less than the Rapport/Drive 2.4 combo (the 2.4 lists for $495, and $299 + $495 = $794). Unless, of course, you covet the supercapacity formatting capability of the Drive 2.4.

At any rate, Rapport is a dynamite package. Maybe a little expensive but impressive. Hats off to Kennect.

Rapport & Drive 2.4 ★★★★1/2

List Price: Rapport, $295; Drive 2.4, $499.
Manufactured by: Kennect Technology, 271 E. Hacienda Ave., Campbell, CA 95008; (800) 552-1232 or in CA (408) 370-2866.
Requires: Mac 512KE, Plus, SE.
Compatibility: Not yet tested with machines equipped with a SuperDrive (the IIx, SE/30, and upgraded II); cable for use with Mac II due soon.
Copy Protection: None

By Henry Bortman



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F O L D E R

Got a Mac problem? Something you'd like explained? Something you can't find the answer for anywhere else? Apple's Chris Espinosa will answer your questions every month in this space. When the questions are too tough or too esoteric for him, he'll get the answers from other members of the Mac team. So ask what you need to know and get your answers straight from the source!

WRITE TO

Help Folder, c/o *MacUser*
950 Tower Lane
18th Floor
Foster City, CA 94404

BY CHRIS ESPINOSA

Cobol, the Lost Language

I am a Cobol programmer on mainframes and PCs. I am going to begin programming in Cobol on the Macintosh, and until now I have not been able to find any advertisements for Cobol compilers for the Mac. Do you know where I can find one?

Emilio Batres
Chicago

There were two Cobol compilers for the Mac in olden days: one from Microsoft and one from MicroFocus. Because of lack of demand, both companies stopped shipping their Cobol compilers.

There are a lot of reasons why Cobol isn't really appropriate for the Mac. The main reason is that a good Mac program lets the user decide what to do next, and Cobol is much more oriented to following flowcharts and filling out forms. It's hard to write a responsive, user-driven application in a language that's designed for processing keypunched data.

But there are still plenty of Cobol programs around. A lot of the world's business is transacted on them each day, and that's not going to change for a while. So Apple offers MacWorkStation, which enables you to create a user-driven Macintosh front end to a mainframe application. It uses a terminal driver on the host to make the host's forms and fields appear as windows, menus, and buttons on the Macintosh.

Version 3.1 was announced at January's Macworld Expo and was expected to ship in March; pricing had not been set at press time. The single-user version (expected to cost about $100) is distributed by the Apple Programmer's and Developer's Association (APDA); (800) 282-2732. For an organization-wide license, contact Apple Software Licensing, Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; (408) 974-4667.

Performance Plus

I want to improve the performance of my Mac Plus with finite expenditure, but none of the articles on hardware enhancements give me a clear idea of the relative value of the different improvements for the kind of computing I do. I use the Mac Plus with an original Apple HD20. Most of my work is in Microsoft Word and HyperCard, and it consists of fancy text manipulation, not number crunching or graphics. The delays that are most annoying to me are in opening applications and, with HyperCard, in running large scripts and changing tools.

Can you give me an idea of the relative benefit I could expect from a) changing to a SCSI hard drive, b) upgrading memory, and c) adding an accelerator board, with or without d) a math coprocessor?



Paul P. Roberts, M.D.
Seattle

For what you're doing, first throw out the math coprocessor. A math coprocessor is useful primarily in object-oriented graphics applications such as Adobe Illustrator or computer-aided design (CAD) packages, and in spreadsheets with large quantities of decimal calculations. It's rarely called upon by the applications you're running. (And while HyperCard may use it automatically through the Standard Apple Numeric Environment [SANE] software built into every Mac, your scripts probably don't do a lot of multiplication and division of extremely large or small numbers, right?)

On the other hand, converting to SCSI will definitely help. Because it transfers information in 8-bit parallel chunks, not serially one bit at a time through the floppy-disk port, a SCSI hard disk will always be much faster than your HD20, especially for the things you note: open-

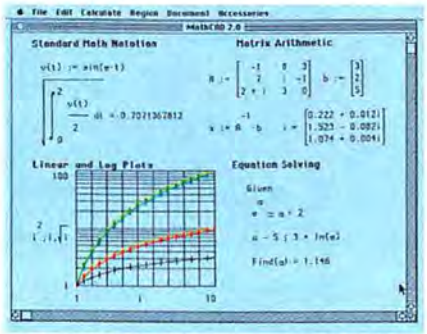
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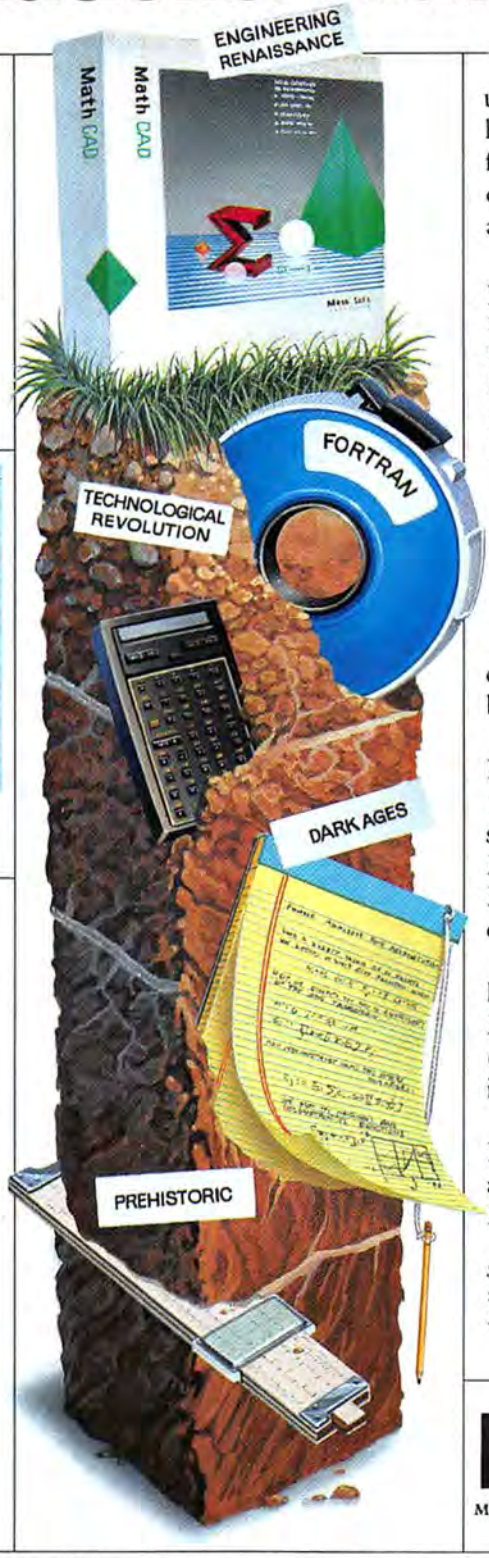


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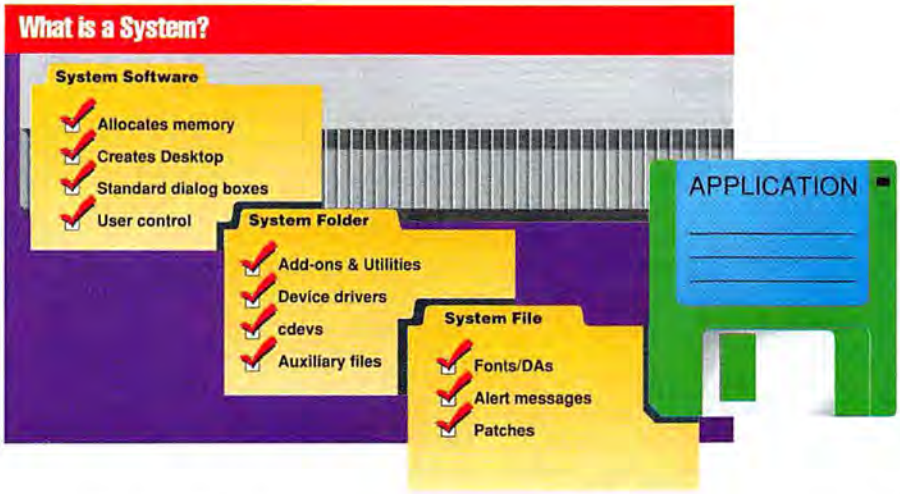
System Requirements: Apple Macintosh Plus, SE or II, with a minimum of 1MB RAM. Supports all ImageWriters® and LaserWriters.®

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ing applications and changing HyperCard tools.

It's the memory upgrade and accelerator that are doubtful. They'll speed things up, but maybe not enough to justify the expense. In both Word and HyperCard, more RAM can help, because you can keep more of the document or stack in memory at once and reduce the frequency of disk use. An accelerator will help speed up HyperCard script execution and Word scrolling and refreshes but only if the stack or document is already in RAM. So while it's preferable to get both, if you have to choose, get the RAM upgrade before the accelerator.

A Challenge

Donald Morris of Moreno Valley, California; Kevin S. Carney of Olympia, Washington, Keith Metzger of San Francisco, and Mark Kronquist of Lake Oswego, Oregon, all claim to know of ways to deprotect Gideon Turner's too-well-protected HyperCard stack (February '89): Deprotect, by Ned Horvath and Allan Foster, and HyperZap version 1.3, by Doug Levy. Both stacks are available from user groups and bulletin boards (and are apparently popular on the West Coast).

But neither Deprotect nor HyperZap lets you get at a stack if you've checked the Private Access box when assigning a password. I couldn't get either one of them to open up a stack I protected using HyperCard version 1.2. So even though I'd still like to see a surefire stack descrambler, my advice remains: Protect Stack is forever. Use it with care.

Beat the Clocks

I am a Macintosh SE owner interested in graphic animation. Being a college student, I have limited funds to buy an accelerator board that contains a numeric coprocessor necessary for faster graphics constructions. Instead, can I increase the graphics-construction speed of my SE by replacing only the Motorola 68000 CPU chip with a faster, 15.67-megahertz chip? Is there any way to simply plug a numeric-coprocessor chip into an empty socket on the SE motherboard that would result in faster graphics? If not, why not?

Mark Hoffman
Ames, IA

Well, pulling the 8-megahertz chip and replacing it with a 16-megahertz chip is like unscrewing a standard light bulb and replacing it with one rated for 240 volts: The capacity is certainly there, but unless it's fed with enough juice, it'll do nothing out of the ordinary. Painstakingly desoldering the SE's 68000 and replacing it with a 16-megahertz model will get you a more expensive SE that's no faster.

A computer system is driven by a set of "clocks" that determine the fundamental speed at which it operates. These clocks drive all the chips: RAM, ROM, I/O channels, and so on. Some of those chips interact with other devices and therefore have critical timing; if you speed up the chip responsible for communicating over LocalTalk, for example, its signals will seem like gibberish to other LocalTalk devices on the network.

So to speed up a system, you must upgrade a lot of components at once and change a number of things in software to accommodate the new speed. Sometimes it's necessary to redesign the main board to get all the components working together at the new speed. That's why the Macintosh SE/30, with its faster 68030, is closer in design to the Macintosh IIx than to the SE.



As for the numeric coprocessor, there just isn't the right empty socket on the SE board. One could design a card for the SE bus with nothing but a numeric coprocessor on it, but I haven't heard of one.

The Mysteries of the System

Please explain the System file and why it's so important.

Richard Cope
Seminole, FL

There are basically two kinds of software you use in a computer: application software and system software. Application software is the stuff you buy to do the job you want to do, and system software is what helps those applications use your computer to the best of its abilities.

Without system software, application vendors would have to write their own software for doing fairly standard things such as saving a file, displaying an error message, or printing on a certain kind of printer. That would open the door to inconsistency because odds are that two application writers won't do the same thing the same way.

So system software sits between the applications and the hardware, providing standard services to the applications, such as allocating appropriate amounts of memory and putting the menu bar, windows, and desktop on the screen. It also provides consistent services to you, the user: the standard Open and Save As dialog boxes, the Chooser, and the Control Panel are all system software meant to give you control of your computer regardless of the application you're using.

Much of the Mac's system software is permanently installed in the machine in read-only memory (ROM). It's there when you turn the machine on, and it controls the startup of the machine. This ROM is



pretty big. It's often a quarter of the size of your regular (RAM) memory. But not all of the system software is in ROM, so the remainder is in two places: the System file and the System folder.

The System file contains all the stuff that didn't fit into the ROM plus a lot of the stuff that can change. Fonts and DAs are stored in the System file as are all alert messages and dialog boxes that the system generates. These are in the System file, not in ROM, so Apple can translate the System file into different languages and not have to change the ROM.

The System file also contains "patches," which fix bugs in the ROM or in previous versions of the System file. Features that have been added can also go in the System file, although adding them is somewhat delicate and requires you to run an installation program. So that's the importance of the System folder: it's a designated place for system software that's not in the System file.

Into the System folder go add-ons and utilities that are loaded in when the System starts up (these are called INITs). Things you can choose from the Chooser (device drivers) and the Control Panel (cdevs) go here too.

And many applications store their auxiliary files — dictionaries, help files, setup files — here as well because it's an easy place to find, and it frees you from having to make sure that each file is in the same folder as the application that wants to use it.

It's important to know what's in your System folder and file. It's the most common starting place for a virus because almost everything in it is "executable" code that is run at some point. Virus-detective programs may list the contents of your System file and System folder and ask if you know why they're there.

When in doubt about an item, move it to another folder, restart your computer, and use it for a few days; if you don't miss it, you probably didn't need it.

Why, Is It Broken?

The Finder is behaving mysteriously. If I hold the Option and Command keys down when I quit from an application, I get the message, "Are you sure you want the desktop rebuilt on the disk 'HD 40'? (This may take a few minutes.)" Can you explain this?

Maxwell Epp
Los Angeles

The Finder was designed a little after the Macintosh file system was written, and there wasn't space reserved in the file system to record some of the Finder's information about each file, namely the name of the application it's used with, its icon, and any notes you've typed into the Get Info box.

This information is stored in an invisible file on each disk called Desktop. The Desktop file contains all the icons used on that disk, a list of all the applications on the disk, and the text in each file's Get Info box. The Finder uses this information when showing icons for documents and when you double-click a document to open it.

The Finder keeps this information up-to-date. Any time you copy a new application onto a disk, its name and all the icons associated with it are logged into the Desktop file. But if you drag a lot of applications on and off your disk, the Desktop file can get large and also slow down the operation of the Finder.

You can rebuild the Desktop file, to start from scratch and record only the names and icons of the applications currently on that disk. This frees up space and speeds up the Finder. You found the way: hold down the Option and Command keys when you enter the Finder, either when starting the computer or quitting an application.

An unfortunate side effect of rebuilding the Desktop file is that it destroys all Get Info notes you've put in. So don't rebuild capriciously. ALSoft's DiskExpress (see Quick Clicks, January '89) is an excellent utility for eliminating fragmentation from hard disks. One of its lesser-known features lets you "compact" the Desktop file; this throws away unused icons without losing the Finder's Get Info notes. DiskExpress retails for $69.95. For more information, contact ALSoft, P.O. Box 927, Spring, TX 77383; (713) 353-4090.

Scrunched Lines on the ImageWriter II

I bought three new Macintosh SEs and ImageWriter IIs, and all three systems have the same bug. The ImageWriter II loses its line spacing on every other printed page and compresses one line of text near the top of the page.

Every even-numbered page has this problem, which ruins all my printouts.

Dvorak's Back

Denis Chabot wrote in the March column about Dvorak keyboards. Readers responded with assistance on both the software and the hardware sides.

Janet Calvert of Bloomfield, New Jersey, sends along a copy of Electric Dvorak, a really fine and free program by Tom Phoenix. Its Installer puts the proper resources in your System file and folder, allowing you to use the Keyboard icon in the Control Panel to switch from QWERTY to Dvorak at any time. (Bring up Key Caps behind the Control Panel when you switch, and the keys on Key Caps change as you choose!) It's very well documented and has some pointers to Dvorak International, an association for promoting the Dvorak keyboard. If you can't locate a copy of Electric Dvorak, you can order it directly from its author. Send $5 (to cover the cost of a disk and postage) to Tom Phoenix, Box 265-ed, Portland, OR 97207-0265. And see the "Dueling Keyboards" sidebar to "Tip for Type" in the November '88 issue for information on typing programs to help you learn the Dvorak system.

To label the keys better, Bruce Bittle of Eugene, Oregon, recommends Reprofilm #400 from Rayven, Inc., 431 N. Griggs St., St. Paul, MN 55104; (612) 642-1112. This clear sticky-back polyester sheet can run through a LaserWriter. It's sold mainly through drafting supply stores. Bittle recommends printing the key-cap letters on it, fixing the image with a fixative spray, and sticking them on the keys. For durability, he suggests laminating a second, unprinted sheet over the printed one.

The compression does not seem to occur when I'm feeding single sheets.

Bob Dattore
Las Vegas

There's a familiar software problem with the ImageWriter II "burping" at the top of the first page to get at the paper that's below the bail, but that's not the problem here. It's not the software, and it's not the printer.

It's the paper. The problem is occurring at every outside fold in the fanfold paper. This paper (medium-weight "razor-perf") has a very stiff fanfold, which doesn't get flattened out by the ImageWriter's platen. Instead, when it gets past the print head, it bulges out again and bumps against the paper bail, jarring the paper beneath and compressing the third or fourth line.

The solution is to change paper types. You should use a lighter-weight paper or one that has a more distinct perforation between pages and seems to be more flexible. It's possible that putting the paper stack farther away from the printer (beneath the desk, for example) and letting it hang by its own weight will straighten out the creases enough to eliminate this problem.

MacWrite to Word

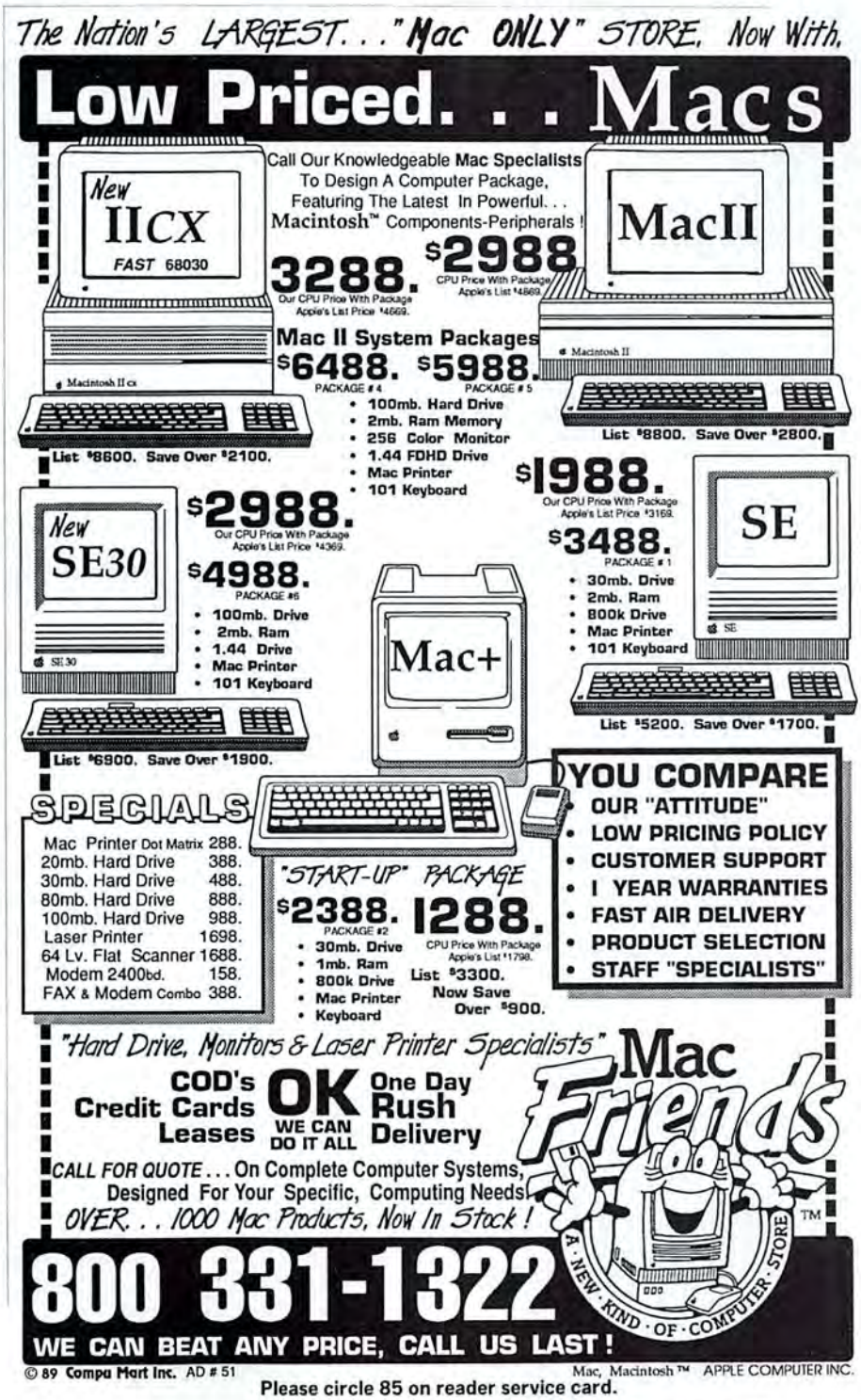
Is there a way I can transfer documents I have created on a Mac 512K using MacWrite version 2.20 to a Mac II using Microsoft Word 3.01? I am a writer, and I would hate to have to retype my entire novel on the newer program. I have tried to call up the MacWrite documents on the Mac II, and it will not open them. The 512K does not recognize Microsoft Word — it brings up the dialog box, "This is not a Macintosh disk, do you want to initialize it?" Help!

Katie Wietrzychowski
Bolingbrook, IL

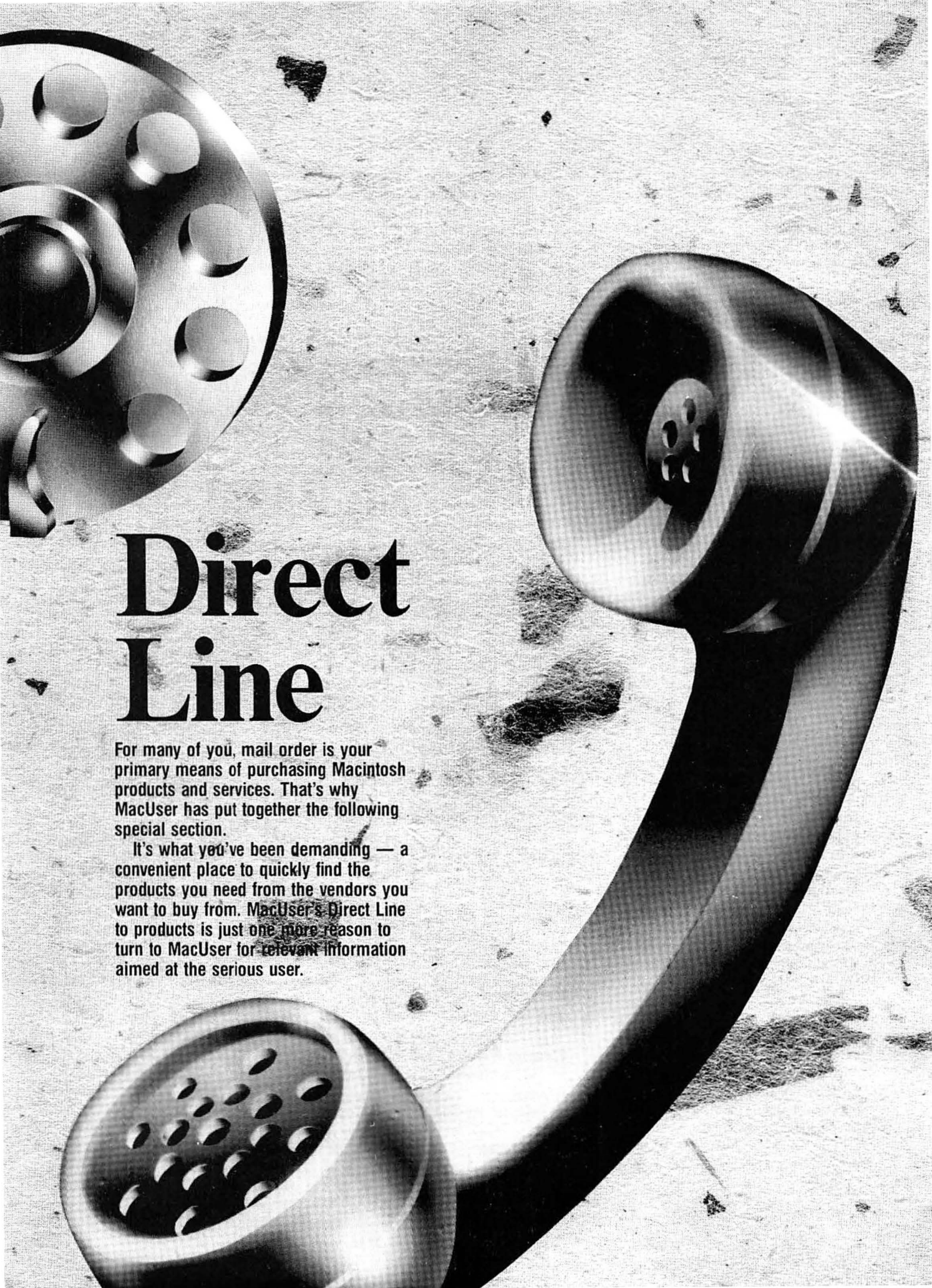
There are a couple of ways. Perhaps the easiest is to use the Text Only button on MacWrite's Save As dialog box and save your text in text files. Then start up Microsoft Word on the II, choose Open, and double-click the text file. You won't get fonts, styles, or formatting, but you won't have to retype anything, either.

A better way is to use MacWrite 4.6 as a "bridge" application. Word 3.01 can't read documents created by older versions of MacWrite, but it can read those from 4.6, and 4.6 can read those from 2.20. So if you have a friend who has MacWrite 4.6, you can run it on the II, open up your documents, then save them again; then open Microsoft Word, choose Open from its File menu, and open the new ones.

Why can't you just run MacWrite 2.20 on the II, or Word 3.01 on the 512K? Because MacWrite versions 4.5 and earlier can't run on the 68020 processor that's in the Macintosh II, and Microsoft Word comes on an 800K disk that can't be read by the 512K's 400K drives.



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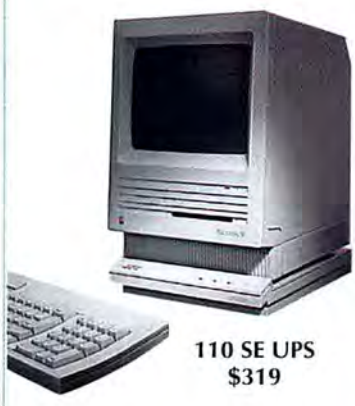
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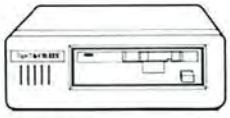
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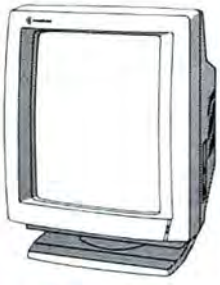
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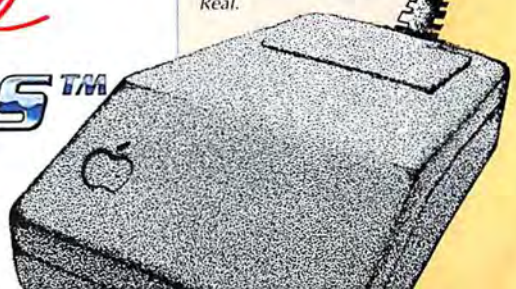
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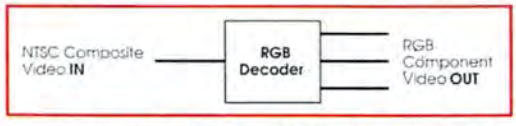


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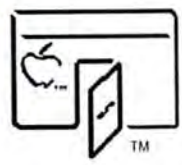
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CMS Enhancements 30 *38ms*	$589.	**$519.**
MacBEST 30 *28ms*	$549.	**$499.**
MicroNet 30 *38ms*	$579.	**$559.**
40 Megabyte		
Caché Systems 45 *40ms*	$629.	**$549.**
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MacBEST 45 *28ms*	$599.	**$579.**
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CMS Enhancements 60 *40ms*	$749.	**$719.**
MacBEST 60 *28ms*	$729.	**$649.**
MicroNet 60 *40ms*	$739.	**$699.**
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Caché Systems 80 *28ms*	$849.	**$679.**
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Quantum 80* *19ms*	$949.	**$899.**
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MacBEST 90 *18ms*	$939.	**$879.**
Quantum 105 *19ms*	$1,099.	**$999.**
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Caché Systems 150 *16ms*	$1,499.	**$1,299.**
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CMS Enhancements 600 *16ms*	$2,999.	**$2,849.**
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MacBEST 45 *28ms*	$499.	**$479.**
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Quantum 40* *19ms*†	$599.	**$569.**
60 Megabyte		
Caché Systems 60 *40ms*	$639.	**$499.**
CMS Enhancements 60 *40ms*	$649.	**$549.**
MacBEST 60 *28ms*	$629.	**$549.**
80 Megabyte		
Caché Systems 80 *28ms*	$729.	**$575.**
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MacBEST 80 *28ms*	$749.	**$679.**
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Conner 100 *25ms*†	$899.	**$829.**
MacBEST 90 *18ms*	$949.	**$825.**
Quantum 105 *19ms*	$999.	**$899.**
150-173 Megabyte		
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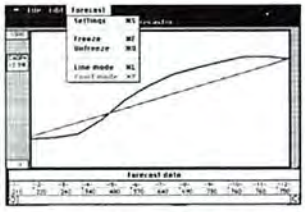
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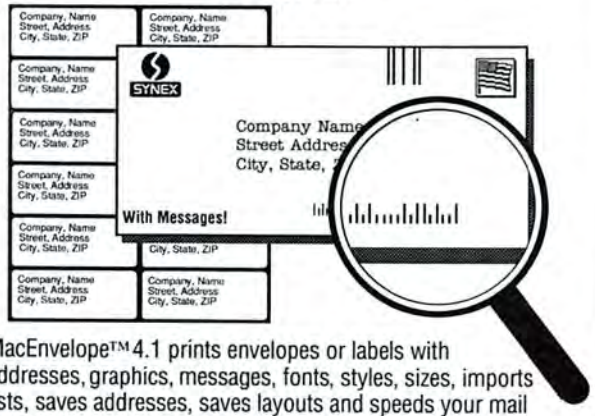
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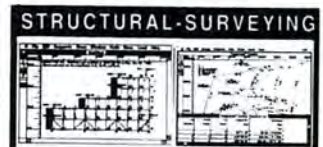
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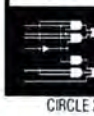
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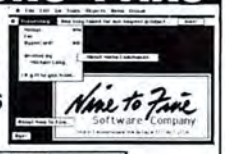
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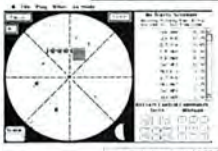




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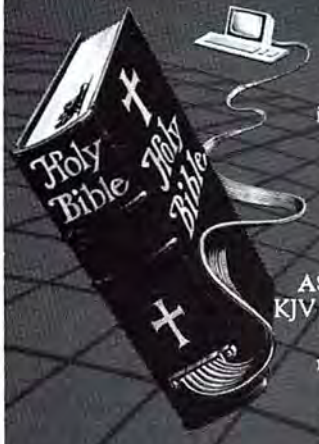
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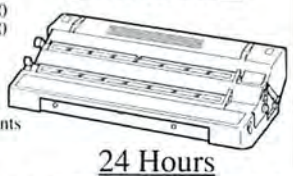
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- ☐ b) Mac SE
- ☐ c) Mac II
- ☐ d) IBM PC
- ☐ e) Other

2. For how many micro computers do you buy products?

- ☐ f) 1-4
- ☐ g) 5-49
- ☐ h) 50+

3. Your primary job function is: (check one)

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5. Are you involved in the purchasing of microcomputer equipment at your company?

- ☐ 5) Yes
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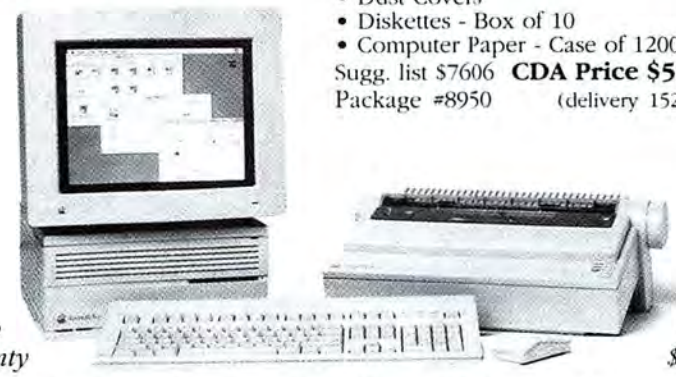
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UPDATES

Seasons change, the weather changes, life changes, and so does software. With all of life's daily changes, keeping up with upgrades and new versions isn't easy.

Therefore, the following chart is an attempt to keep the interest and knowledge of Mac users up-to-date with upgrades and new versions (as of press time) of many popular programs. To see if you have the most-current version, check the About box at the top of the Apple menu when you run a program.

Those with a 512K, 512KE, or XL should be running System 3.2 and Finder 5.3. Everyone else should be running System 6.0.3.

Apple has two updates this month: version 1.2 of the AppleFax Modem software — the AppleFax Modem is a peripheral that allows Macs to send and receive facsimile documents — and Virus Rx 1.4, a free virus-detection program available in the AppleLink Technical Info library to assist in the detection of the Scores virus.

Key

CP or **NCP**, copy-protected or not;
//, programs we have found to be Mac II-compatible (not yet a comprehensive list);
S for shareware (try before you buy).
Boldface, changes and new listings.

All programs listed here are HFS-compatible. Programs that appear to be compatible with the Mac II may not actually perform 100 percent of the functions they do on other Macs, and they may not necessarily take full advantage of the Mac II.

Application	Version		Application	Version		Application	Version		Application	Version	
A.A.I.S. Prolog M	1.15	NCP	Fontographer	2.3	CP	**MacNosy (The DeBugger)**	2.0	NCP	QuickMail	2.0	NCP, //
Aatrix TimeCard	2.0	NCP, //	FontShare	1.1	NCP, //	MacPaint	2.0	NCP, //	QuickWord	2.0	NCP, //
Accountant, Inc.	2.1	NCP, //	Forecast	2.0	NCP, //	MacPalette	1.0	CP	**Rags to Riches**	3.0	NCP, //
Acta	2.0	NCP, //	4th Dimension	1.0.6	NCP, //	MacPascal	2.1	CP	Ragtime	2.01	NCP, //
AffiniFile	1.1	NCP, //	FoxBASE+/Mac	1.10	NCP, //	**MacProject II**	2.0	NCP, //	Read-It!	2.0	NCP, //
AMS General Ledger	2.08	NCP	Frame Mac	1.1	NCP, //	MacProof	3.0	NCP	Ready,Set,Go!	4.5	NCP, //
AppleFax Modem	1.2	NCP, //	FreeHand	2.0	NCP, //	MacSchedule	1.1	CP, //	Record Holder	2.1	NCP
AppleShare Workstation	2.0.1	NCP, //	FreeTerm	2.0	NCP, //	MacScheme+Toolsmith	1.51	NCP, //	Red Ryder	10.3	NCP
ArtRoom	3.0	NCP, //	**Full Impact**	1.1	NCP, //	MacServe	2.3	CP, //	REdit	1.2	NCP
Assistant Controller	5.4	NCP, //	FullPaint	1.0	NCP	MacSpec	1.3	CP	Reflex Plus	1.01	NCP, //
Aztec C	3.4b	NCP, //	**FullWrite Professional**	1.1	NCP, //	MacSpin	1.1	CP	Reports	1.2	NCP, //
Back to Basics	1.03	NCP	General	3.3	NCP	MacSpool	3.0	NCP, //	ResEdit	1.1b7	NCP, //
Backgrounder	1.2	NCP	**Generic CADD Level 1**	1.1	NCP, //	MacTell	3.5	NCP, //	Sales Associate	1.10	NCP, //
Bulk Mailer	3.23	NCP, //	GeoQuery	1.01	NCP, //	MacTerminal	2.3	NCP, //	Scrapbook	2.4	NCP, //
Business Filevision	1.1	NCP	Glue	1.04	NCP	MacTools (MFS/HFS)	7.1	NCP	SCSI Tool	1.1	NCP, //
CalendarMaker	3.0	NCP, //	GraphicWorks	1.13	NCP	MacWrite	5.0	NCP, //	Sensible Grammar	1.1d	NCP, //
Canvas	2.0	NCP, //	Handwriting Analyst	1.2	NCP, //	MailManager	1.0	CP	**ShuBox Filing**	7.0	NCP, //
Capture	1.1	NCP, //	Hard Disk 20	1.1	NCP	Managing Your Money	2.0	NCP, //	SideKick	2.0	NCP
CAT	2	NCP, //	Hard Disk Utility	2.0	NCP	Map	1.1	NCP	Silicon Press	1.1	NCP
Chart	1.02	NCP	HD Backup	1.1	NCP	Maple	4.2	NCP, //	Slide Show Magician	1.3	CP
Chooser	3.3	NCP	HD SC Setup Apple	2.0	NCP	MapMaker	3.0	NCP, //	Smartcom II	3.0a	NCP, //
ClickArt Effects	1.01	NCP, //	HFS Backup	3.0	NCP, //	Master Tracks Pro	3.3	CP, //	SmartScrap & Clipper	2.01	NCP, //
Clipper	1.01	NCP	HFS Locator Plus	2.0	NCP	MathWriter	2.0	NCP, //	SmoothTalker	3.0	NCP
CloseView	1.0	NCP	HyperAnimator	1.5	NCP, //	Mavis Beacon Teaches Typing!	1.2	NCP, //	Sound	3.3	NCP, //
Cognate	1.5	NCP, //	HyperCard	1.2.1	NCP, //	MDA	2.0	NCP, //	SoundCap	4.4	CP
Colleague	1.2	NCP, //	HyperDA	1.1	NCP, //	MDS	2.0	NCP	Space Edit	2.0	CP, //
ColorChart	1.3	NCP	HyperEngine	1.1	//	Measure Test	12.7	CP, S, //	SpellNow	1.0	NCP
Colorizer	1.1	NCP, //	**Illustrator 88**	1.8	CP, //	Megamax C	3.0	NCP	Spellswell	2.0f	NCP, //
ColorMate	2.1	NCP	ImageWriter	2.7	NCP	**Membership List**	6.0	NCP, //	Startup Device	3.3	NCP, //
ColorPrint	2.03	NCP	ImageWriter, AppleTalk	2.7	NCP	MGMStation CAD	2.5	NCP, //	StatView 512+	1.1	NCP
Comic Strip Factory	1.6	NCP, //	ImageWriter LQ	2	NCP, //	Micro Planner Plus	6.0	NCP, //	StatWorks	1.2	NCP, //
Comic Works	1.0	NCP, //	ImageWriter LQ, AppleTalk	2	NCP, //	MicroPhone	1.5	NCP, //	Stella	1.3	CP, //
Comment	2.0	NCP, //	InBox	3.0	NCP, //	MicroPhone II	2.0	NCP, //	Stepping Out II	2.01	NCP, //
ConcertWare+	4.0	NCP, //	Insight Expert Accounting	2.01	NCP, //	MindWrite	2.0	NCP, //	Straight Talk	2.08	NCP, //
ConcertWare+ MIDI	4.0	NCP, //	Installer	2.04	CP, //	MockPackage+	4.4	NCP, //	Studio Session	1.4	CP
Control Panel	3.3	NCP	inTalk	3.0	NCP, //	Modern Artist	2.0	NCP, //	Suitcase	1.2.1	NCP, //
Copy II HD	7.1	NCP	Interleaf Publisher	3.5	CP, //	MORE II	2.0	NCP, //	Suitcase II	1.2	NCP, //
Copy II Mac	7.1	NCP	Jam Session	1.1	CP, //	Mouse	3.3	NCP	SUM (Symantec Utilities for Macintosh)	1.1	NCP, //
Course Builder	3.1	NCP, //	Jazz	1A	CP	MPW	3.0B1	NCP, //	SuperGlue	1.05	NCP, //
Cricket Draw	1.1.1	NCP, //	JustText	1.1	NCP	MS BASIC	3.0	NCP	SuperPaint	1.00	NCP, //
Cricket Graph	1.2	NCP	Key Layout	2.3	NCP, //	MS BASIC Compiler	1.0	NCP	Switcher	5.1	NCP
Cricket Presents	2.0	NCP, //	Keyboard	3.3	NCP	MS Fortran	2.2	NCP	Systat	3.2	NCP
Curator	1.05	NCP, //	Language Systems FORTRAN	1.2	NCP, //	MS Works	1.1	NCP, //	System (HFS)	6.0.3	NCP, //
DA Handler	6.0	NCP	LapLink Mac	2.0	NCP, //	MultiFinder	6.0	NCP, //	System (MFS-128K)	2.0	NCP
Deluxe Music	2.5	CP	Laser Author	1.3	NCP, //	Multiplan	1.11	NCP, //	Telescape	1.0	NCP, //
Design/IDEF	1.1	NCP, //	Laser Prep	5.2	NCP	**Music Librarian**	6.0	NCP, //	Telescape Pro VT 100	1.1	NCP
DesignScope	1.14	NCP, //	LaserPaint	1.9	NCP, //	Music Publisher	2.0	NCP, //	Tempo II	1.1	NCP, //
DeskLink	2.0	NCP, //	LaserShare	1.0	NCP	**Musical Word Game**	1.5	NCP, //	Tetris	1.1	NCP, //
Disk Express	1.10	NCP	LaserSpeed	1.6	NCP, //	MusicWorks	1.1	CP	Textures	1.01	NCP, //
Disk First Aid	1.4	NCP	LaserStatus	2.0	NCP	myDiskLabeler	2.11	NCP, //	Think 'n Time	2.0	NCP, //
Disk Ranger	3.1	NCP	LaserWriter	5.2	NCP	'Ncryptor	2.0	NCP, //	Thunder!	1.0.1	NCP
Disk Tools Plus	1.01	NCP, //	LaserWriter IISC	1.1	NCP	Neon	2.0	NCP	Thunderscan	4.0	NCP
DiskFit	1.5	NCP, //	Layout	1.3	NCP, S	**NightWatch**	1.03	NCP, //	**TimeMinder**	2.0	NCP, //
DiskInfo	1.45	NCP, S	Legal Billing	1.86	NCP, //	Omnis III Plus	3.3	NCP, //	Timeslips III	1.1	NCP, //
DiskTop	3.0.4	NCP, //	Legal Billing II	2.56	NCP, //	On Cue	1.3	NCP, //	TML Pascal II	3.0	NCP, //
Dollars & Sense	4.0	NCP, //	Lightspeed Pascal	2.0	NCP, //	Orbiter	1.2	NCP, //	TMON	2.8	NCP
Double Helix II	r40	NCP, //	LightspeedC	3.0	NCP, //	OverVUE	2.1e	NCP, //	Top Desk	3.0	CP
"Draw It Again, Sam"	2.04	NCP, //	Listen	2.02.1	CP, //	PageMaker	3.01	NCP, //	TOPS	2.0	NCP, //
Dungeon Revealed	1.2.3	NCP, //	Lookup	1.0c	NCP, //	Parameter Manager Plus	3.0	NCP, //	Trapeze	2.1	NCP, //
Easy Access	1.0	NCP	Mac C	5.0	NCP, //	Performer	2.31	CP	Turbo Download	2.1	NCP, //
Easy3D	1.01	NCP	Mac Daisy Link	1.04	NCP, //	P51 Mustang Flight Simulator	2.02	CP, //	Turbo Maccountant	2.0	NCP, //
Edit	2.1	NCP	Mac Disk Catalog II	2.1c	NCP	PictureBase	1.2	NCP	Turbo Pascal	1.1	NCP, //
Excel	1.5	NCP, //	Mac Zap	5.0	NCP, //	Plains and Simple	4.1	NCP, //	Type Now	1.0	NCP, //
ExperCommon Lisp	2.2	NCP	Mac3D	2.1	NCP, //	PLP	2.0	NCP, //	VersaTerm	3.0	NCP
ExperLisp	1.5	NCP, //	MacASM	1.2	NCP	PowerPoint	2.01	NCP, //	VersaTerm Pro	2.0	NCP
ExperLogo	1.1	NCP	MacBILLBOARD	4.01	NCP, S	PowerStation	2.5	NCP, //	VersaCAD	2	NCP, //
Expressionist	2.0.3	NCP, //	MacCalc	1.2	NCP	Print Monitor	1.2	NCP, //	VideoWorks II	2.0	NCP, //
EZ Draft	2.0	NCP, //	MacChuck	1.5	NCP, //	Professional Composer	2.1	CP	VIP	2.5	NCP, //
Falcon	2	NCP, //	MacDesigner	2.0	NCP, //	Profit Stalker II	1.3	NCP	Virex	1.1	NCP, //
Fast Forms	1.2	NCP, //	MacDraw II	1.1	NCP, //	Programmer's Online Companion	2.0	NCP, //	**Virus Rx**	1.4	NCP, //
FastBack	1.02	NCP, //	MacDraft	1.2b	NCP, //	Project Billing	3.0	NCP, //	Widgets	3.0	NCP
Ferrari Grand Prix	1.5	CP, //	MacFlow	2.04	NCP, //	Prototyper	2.0	NCP, //	Word	4.0	NCP, //
File	2.0	NCP, //	MacFortran (all)	2.4	NCP, //	**Publish or Perish**	4.0	NCP, //	WordPerfect	1.0.2	NCP, //
Filemaker II	1	NCP, //	MacFortran / A/UX	1.0	NCP, //	Pyro!	3	NCP, //	Works	2.0	NCP, //
Finder (HFS)	6.1	NCP	MacGolf Classic	3.0	CP, //	QuarkStyle	1.0	NCP, //	WorksPlus Spell	2.0	NCP, //
Finder (MFS-128K)	4.1	NCP	MacInTalk	1.1	NCP	QuarkXPress	2.0A	NCP, //	Write	1.0	NCP, //
Findswell	2.0	NCP, //	MacLabeler	2.2	CP	QUED/M	2.07	NCP, //	WriteNow	2.0	NCP, //
1st Aid Kit-HFS	2.5	NCP, //	MacLinkPlus	3.0	NCP, //	QuicKeys	1.1	NCP, //	**ZBasic**	4.0	NCP
FONTastic Plus	2	NCP, //	MacMoney	3.02	NCP, //						
Font/DA Mover	3.8	NCP	MacMovies	1.02	NCP						
FontFolio	1.0	CP, //									

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FROM THE DUBL-CLiCK COLLECTION



MacUser gave WetPaint 5 mice (Sept. 1987) saying "...the WetPaint art is almost a must for clip-art users; the ArtRoundup desk accessory is a neccessity." Volumes marked with * were previously released as part of the award winning "MacMemories" series.

WETPAINT

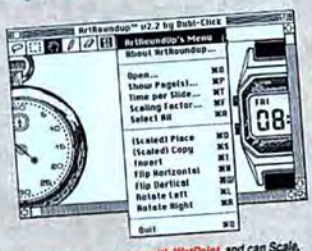
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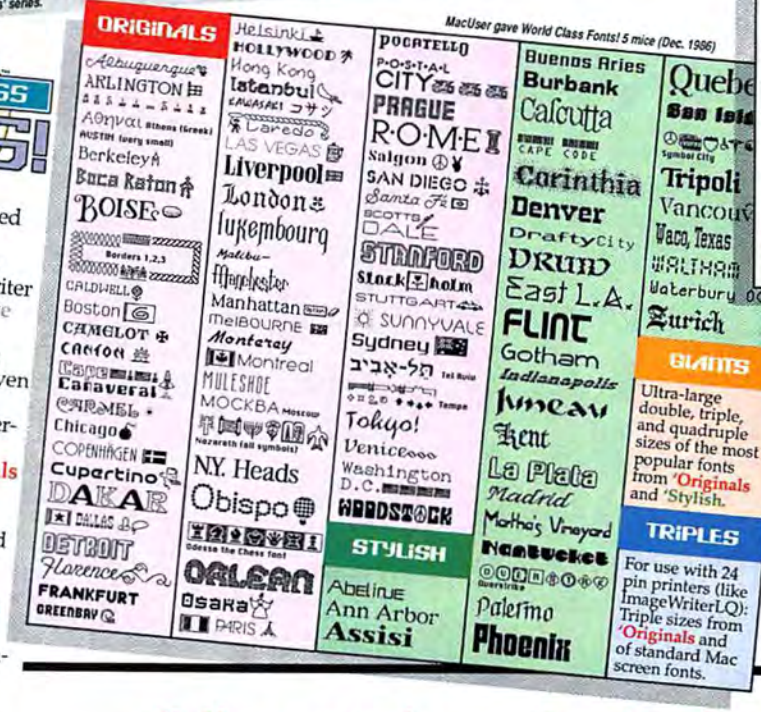
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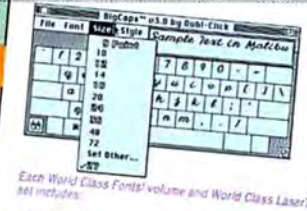
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MacUser gave World Class Fonts! 5 mice (Dec. 1986)





Each World Class Fonts! volume and World Class LaserType set includes:

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- Default Font (desk accessory) changes the font most applications default to when first started.

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SCRAPBOOK



The Breakdown: Laser Printing

Many hidden costs factor into the total price you'll pay for printing a typical page on a laser printer. They include everything from bandages for those inevitable paper cuts, and labor and shoe-leather costs associated with endlessly refilling the paper tray or fixing a jammed sheet feeder, to real estate rental for the laser printer. Here's what you can expect to pay, based on throughput of 18,000 pages a year.

— Kristi Coale and Michele Stokol

Item	Cost	Cost / year
LaserWriter IINTX	$275/month (rental)	$3,300.00
AppleCare service contract	$504/year	$504.00
Toner cartridge	$129/cartridge	
Amount of toner/cartridge	40 oz	
Amount of toner/page	.0114 oz	
Number of pages/cartridge	3,500 pages	$1,990.28
LaserWriter II footprint	2.37 sq ft	
Office space rental for 2.37 sq ft		
in Manhattan, New York	$33.60–$42/month	
in Manhattan, Kansas	$8.40–$20.16/month	
Average	$26.04/month	$312.48
Transit time for attending to printer	47.6 minutes/week	
Labor cost for above	$10.95/week	$569.40
Distance traveled to and from printer	50 miles/year	
Lifetime of shoe heels	1,000 miles	
Cost per reheeling	$18 for heels and soles	
Shoe repair cost due to printer-related transit	.05 reheels/year	$0.90
Number of paper cuts	4/week	
Cost of bandages for printer-related injuries	$2.19/box of 200	$2.19
Paper	$8.14/ream	
Number of pages needed	1,500/month	
Percentage that prints correctly	33%	
Total pages printed	4,500/month	$73.26
Electricity consumed	309 kilowatt-hours/month	
Cost of electricity	$30.90/month	$370.80
Total		**$7,123.40**
THE BOTTOM LINE: COST PER USABLE PAGE		**$.40**

Sources:
Apple Computer;
Coldwell Banker of Manhattan, New York;
Century 21 Realty of Manhattan, Kansas;
Rent-a-Computer of Santa Clara, California;
Safeway of San Mateo, California;
Pacific Gas & Electric; and
The Breakdown Guess-O-Matic™ Dart Board.

PHOTOGRAPHY PETER ALAN GOULD ILLUSTRATION MARK W. SWEENEY

Edited by Kristi Coale

A Geodesic World



■ **The Global Data Manager, based on Buckminster Fuller's Dymaxion map of the world, gives you all the information you'll need to operate Spaceship Earth.**

At the 1967 World's Fair, Buckminster Fuller unveiled a geodesic globe 250 feet in diameter that converted the sphere into an interlocking system of planes — his so-called Dymaxion map of the world. Linked to computers, this map was the primary tool in a World Game simulation. World leaders could use this map to postulate real-world outcomes, based on known statistical quantities, and make decisions accordingly.

On a much smaller scale, The Global Data Manager from World Game Institute incorporates Fuller's World Game map — only now it fits on a Mac. The program uses a statistical database culled from annotated world-data sources. You can manipulate the figures in a dedicated spreadsheet and plot them on the Dymaxion map or graph them on a bar chart.

You can buy the first draft of Global Data Manager for $95 from the World Game Institute (which is affiliated with the Buckminster Fuller Institute), at the University City Science Center, 3508 Market St., Philadelphia, PA 19104; (215) 387-0220.

— **Michael Miley**

Dialog Box of the Month

Conventional wisdom tells us that clicking on an application's icon launches that particular program. Sure — the same way turning the key in the ignition always starts the car. Michael Franklin of Boston, Massachusetts, found this dialog box when he tried launching SuperLaserSpool. His reaction? If the folks at SuperMac can program SuperLaserSpool to tell you it doesn't work, they should cut out the intermediate step and just program the disk to work.

Due to an unfortunate disk duplication error, you have not received a working copy of SuperLaserSpool. Please contact SuperMac Software as soon as possible to receive a working copy of SuperLaserSpool.

We apologize.

■ **If you come across an interesting dialog box, send a printout and a screen dump of it on a disk, along with your name and address, to Dialog Box of the Month, c/o *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404. If we print it, you'll receive fame, glory, and ten bucks.**

— **Kristi Coale**

Memory Lane

"The Macintosh uses an experimental pointing device called a 'mouse.' There is no evidence that people want to use these things.

"What businessman knows about point sizes on typefaces or the value of variable point sizes? Who out there in the general marketplace even knows what a 'font' is?

"The whole concept and attitude towards icons and hieroglyphs is actually counterrevolutionary — it's a language that is hardly 'user-friendly.'

"This type of machine was developed by hardware hackers working out of Xerox's Palo Alto Research Center. It has yet to find popular success. There seems to be some mysterious user resistance to this type of machine."

— John C. Dvorak on why the Macintosh would fail, *San Francisco Examiner*, February 19, 1984



Telling Time

A brief history of hardware, software, vaporware, and elsewhere.

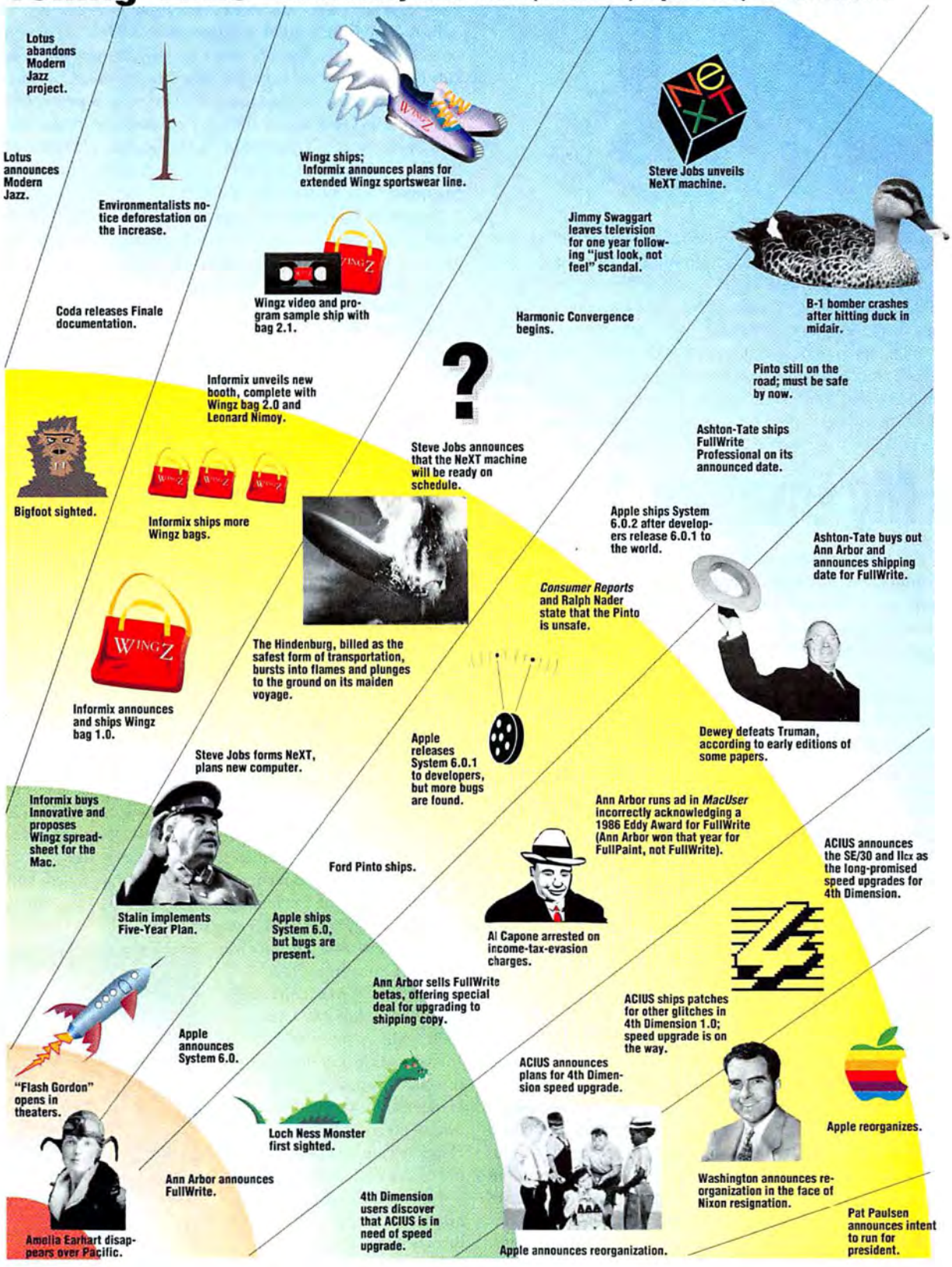


ILLUSTRATION MARK W. SWEENEY

DEVIL'S ADVOCATE



There's that Woody Allen joke about the old lady who says the food in the restaurant is terrible. Her friend says, "Yes, and such small portions!" I can't explain the exact mechanism of the humor, but it's similar to the way I feel about awards. I hate them. And, boy, they never give 'em to the right people.

With that in mind, I'm starting the Devil's Advocate Anti-Awards for Distinguished Achievement (the DADAs). It's my counter to the *MacUser* Eddies (see the May '89 issue), some of which had me baffled. So let's go to the podium and present the DADAs to products that deserved some recognition.

Take My Envelope, Please

The first award given by *MacUser* is for **Most Significant Product,** one that will change the course of computing. The *MacUser* editors gave the award to Vaccine! Oh, brother. It's a fine product, but how this is significant eludes me. Next year I suppose it will go to WordStar on the Mac!

Actually, the most significant 1988 product in the Mac community is the Apple Mac IIx, the first important desktop computer to use the Motorola 68030 chip. It's obvious.

The next category is **Best New Emerging Technology.** Hey, guys — you completely ignored the emerging (and important) category of optical-character-recognition software. OmniPage, TextPert, and Read-It! all get the Dvorak award.

Best New Storage System: The DADA goes to the newest CDC Wren drives. **Best New Utilities and Desk Accessories:** Not even mentioned by the editors is the outstanding On Cue, a file launcher not much different from the fancy "docking software" used by the Mach operating system. Hot stuff! Best DA is DeskPaint from Zedcor. So far I'm having a credibility problem with the Eddies. But what do I know?

Best New Financial Package: No award. Nothing new or interesting. (But that goes without saying in this category.)

Best New Connectivity Product (Mac to Non-Mac): What do Mac and PC users use to connect? LapLink Mac from Traveling Software, that's what. It gets my award.

Best Networking Product: NetWare from Novell. Gee, it seems obvious that this is the proper category for this product.

Best New Programming Language: Uh-oh. I agree with an Eddy pick: LightspeedC. **Best New Desktop Presentation Product:** A dubious category, but I agree with the selection of Persuasion. So far the editors have two out of nine right.

Best New Typographic Product: To me this means fonts. Who better to win than Casady & Greene for its selection of interesting and inexpensive fonts? Jott is my favorite.

Best New Educational Product: Who knows? Maybe it should go to Apple and Microsoft for ensuring that all those kids in law school will have jobs when they graduate.

Best New Flat-File Manager: Here's a classic noncategory, like giving an Oscar to Kevin Kline for Best Consumption of a Fish Called Wanda. What's next? Best Hierarchical Database? Best Network Database? C'mon...let's just do **Best Database Manager.** Give an award to FileMaker II from Claris.

Best New Page-Layout Program: The Eddies didn't reward new programs; they rewarded upgrades. I'd give the award to MaxPage. It's new, interesting, and easy to use.

Best New Spreadsheet: OK, Full Impact wins.

Best New Telecommunications Program: No award. Sorry.

Best New Word Processor: Another correct answer with WriteNow 2.0, the word processor most of us use. Besides that, Heidi Roizen can bat her eyes better than the Ashton-Tate guys.

Best New Science/Engineering Product: Mathematica.

Best New Desktop Video: Get real. This is not a category. But if it has to be, then let's give the hottest desktop-video product the award: the Sony 8mm Video Walkman. That's the device everyone uses for quickie demos.

Best New Paint Program: Studio/8.

Best New Draw Program: Sheesh. This is splitting hairs, isn't it? Draw, paint — so what's the Best New Doodling Program? I say drop the category and also drop **Best New Image-Processing Hardware, Best New Image-Processing Software (Black and White),** and **Best New Image-Processing Software (Color).** Image processing is for politicians, not computers. And I'd forget **Best New Color and Monochrome Display Systems,** since everything's going to be obsolete under 32-bit QuickDraw.

Best New Music and Sound: MacRecorder.

Best New Recreation Program: Falcon II with modem capability is by far the best new recreation program. The *MacUser* editors — known Crystal Quest junkies — made that program a runner-up in 1987. In '88, Crystal Quest added one feature and snagged top honors. Sounds bogus to me.

Best New Add-in Board: SuperMac Spectrum 8 Series II.

Best New Input Device: I'd go for the WristMac, which helps us all fulfill our Dick Tracy fantasies.

Best New Output Device: Apple's LaserWriter NTX.

Best New CAD/CAM Package: VersaCAD 2.0. One more for the editors. They're 7 for 26.

And a category left out for reasons unknown: **Best New HyperCard Application.** This award goes to Bill Atkinson's HyperScan, a superb application not even mentioned in passing.

Now you see why I don't like awards. Nobody who deserves them gets them.

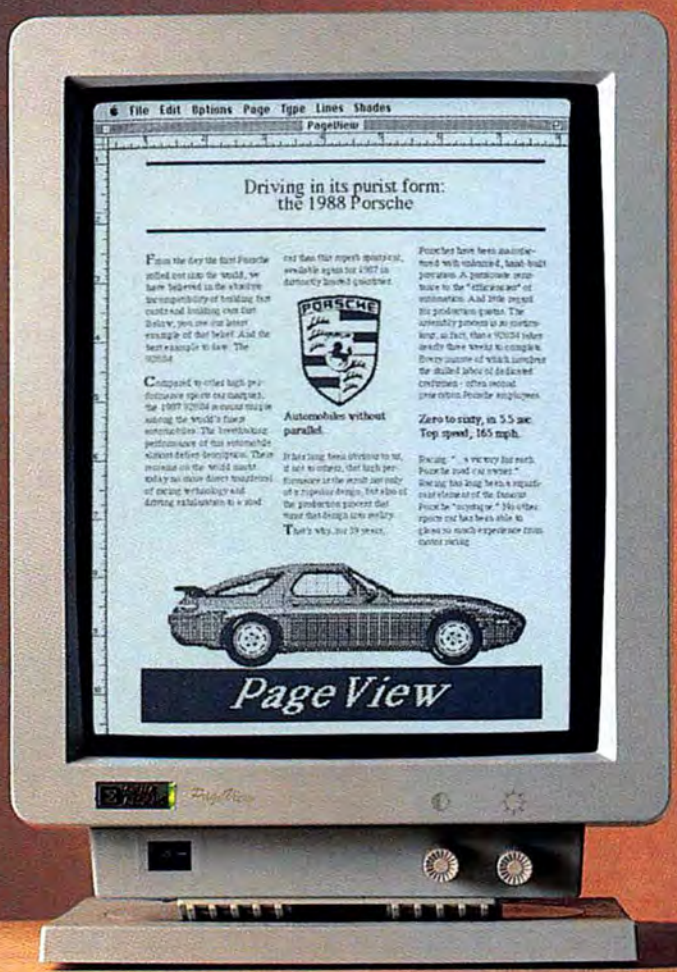


By John C. Dvorak

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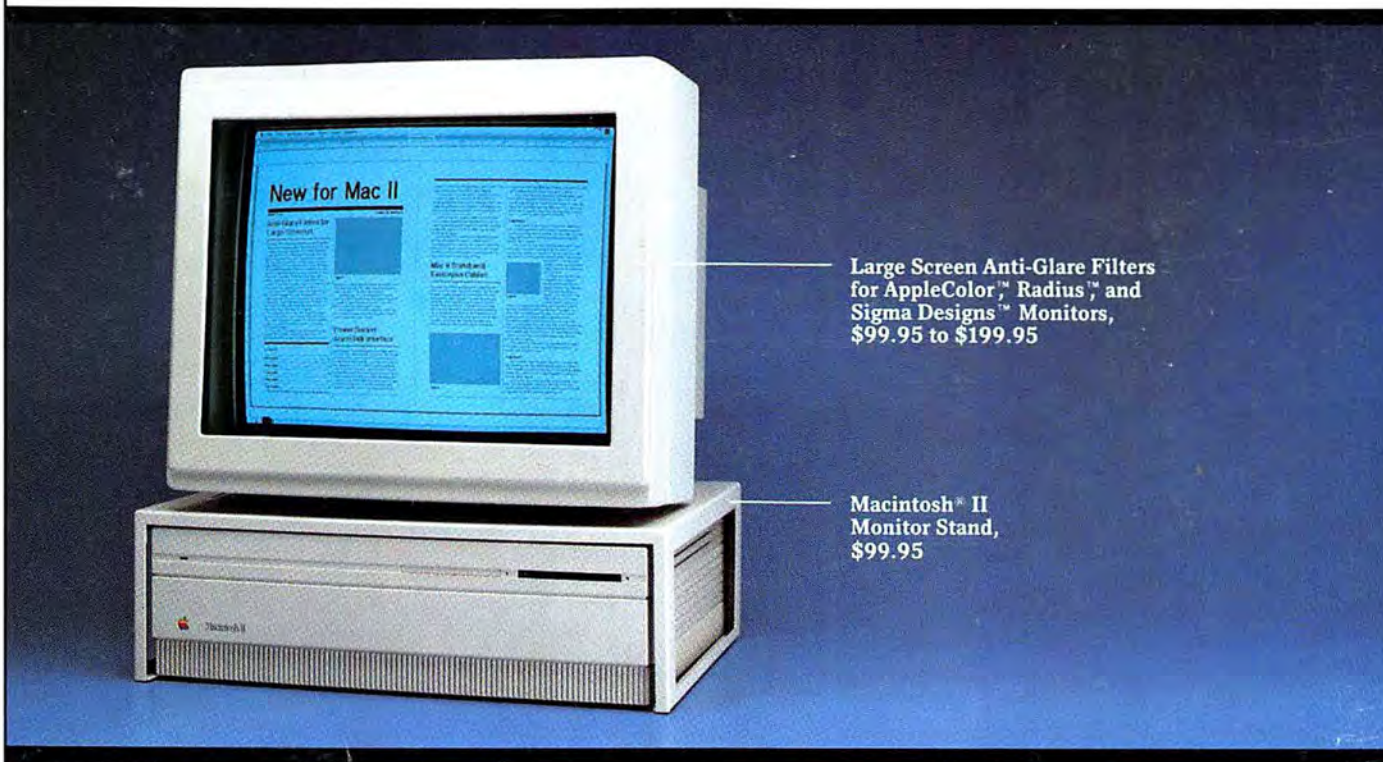
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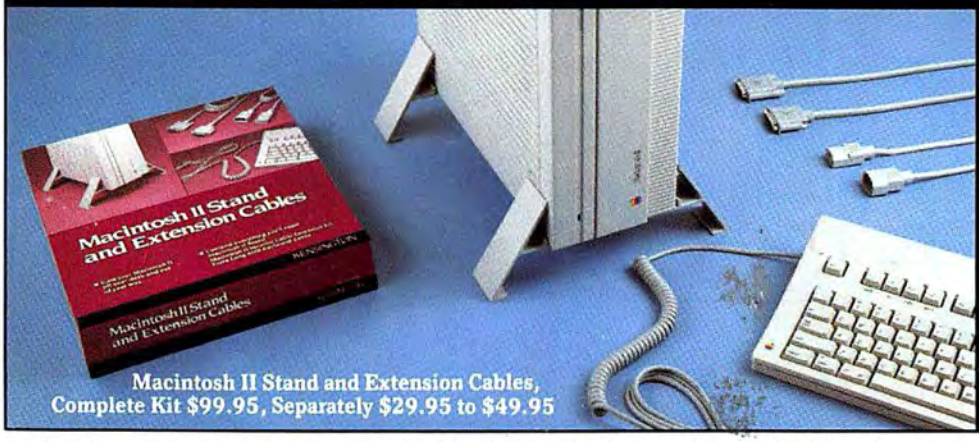


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